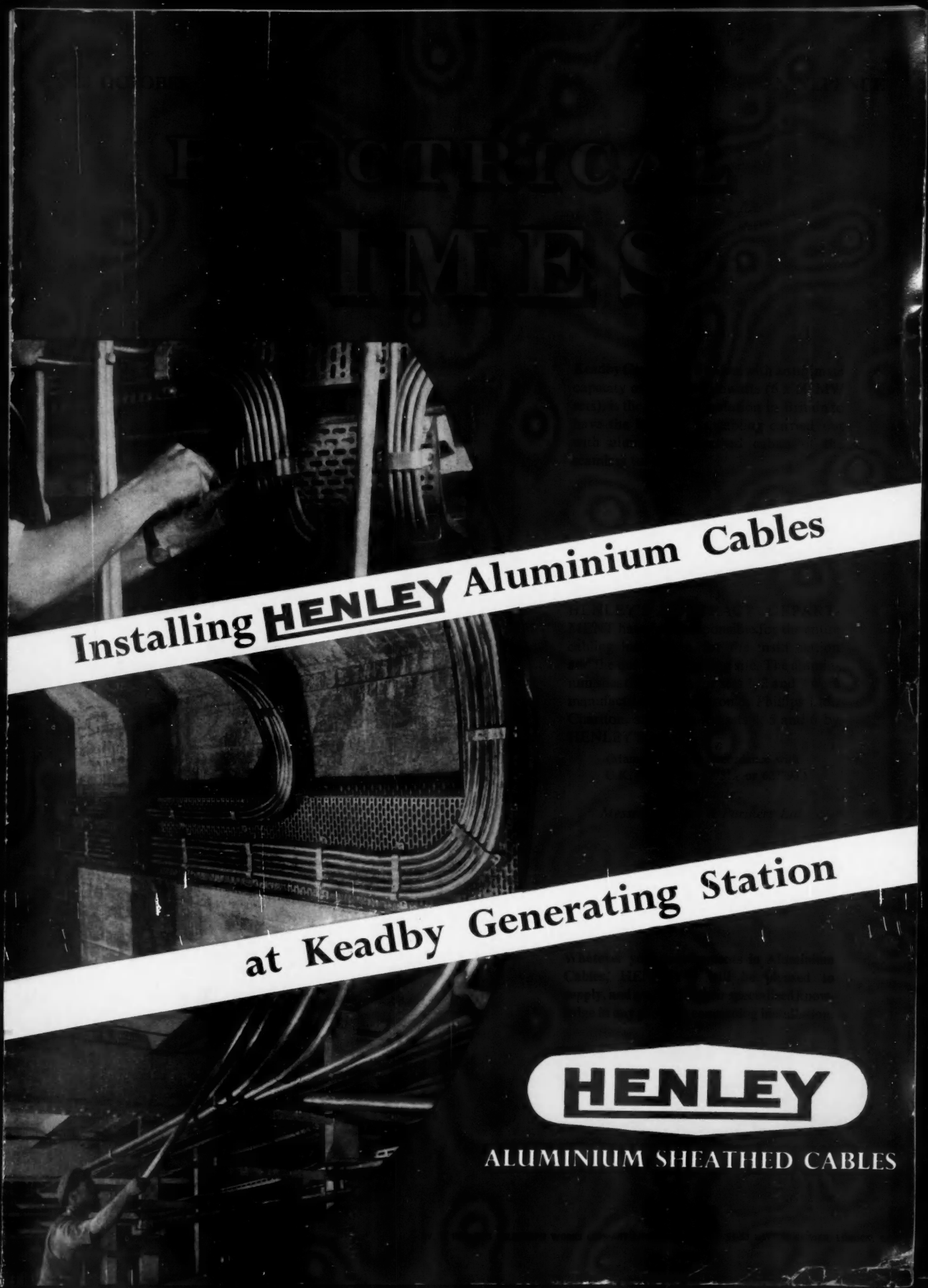
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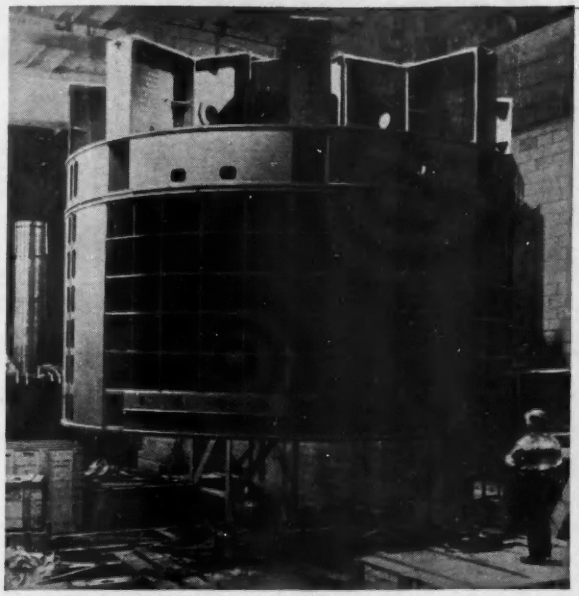

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The Kitimat project of the Aluminium Company of Canada plans eventually for an annual production of 500,000 metric tons of aluminium, requiring electrical power equivalent to 1,650,000 h.p. The initial stage of this scheme, comprising 450,000 h.p. is completed. The ENGLISH ELECTRIC Company's contribution to this first stage is a 105,000 kVA alternator. This is one of the largest water-turbine-driven alternators built in Great Britain, and was delivered well ahead of schedule.
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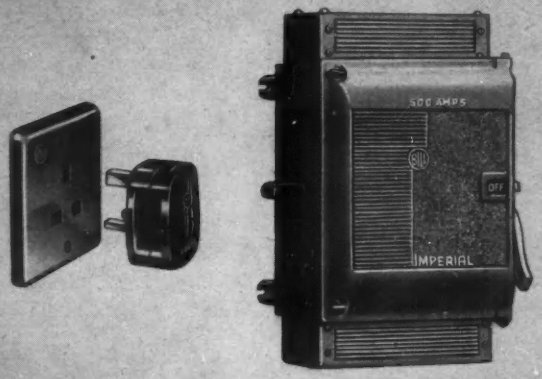

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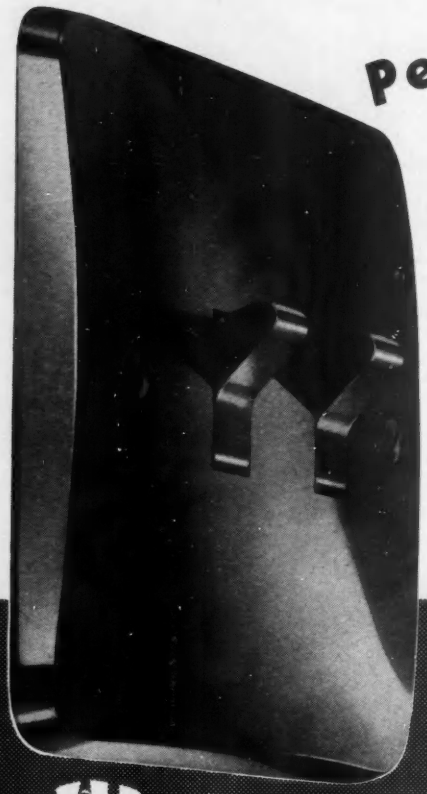

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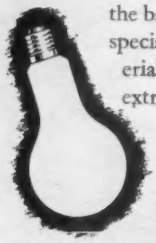

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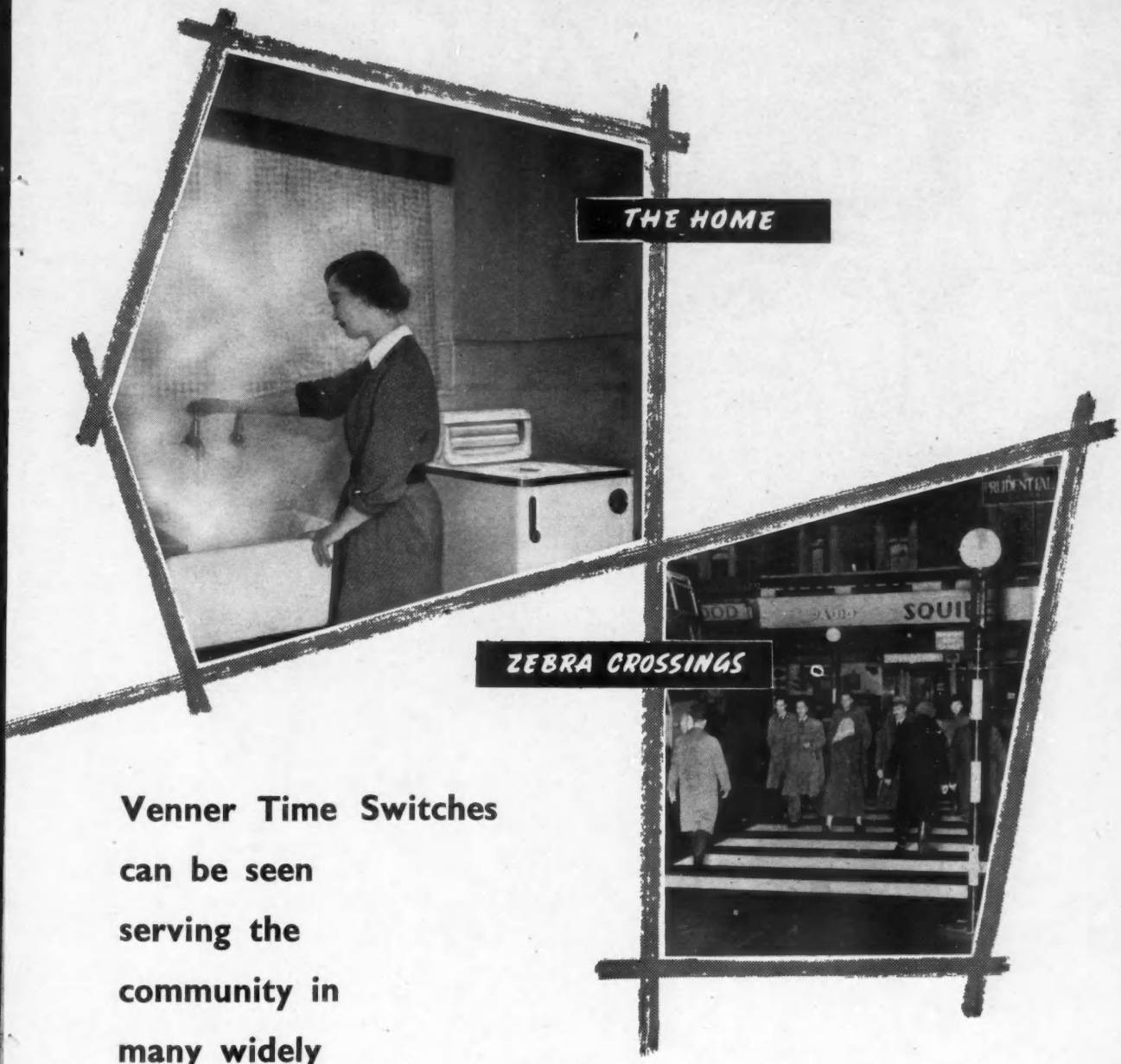

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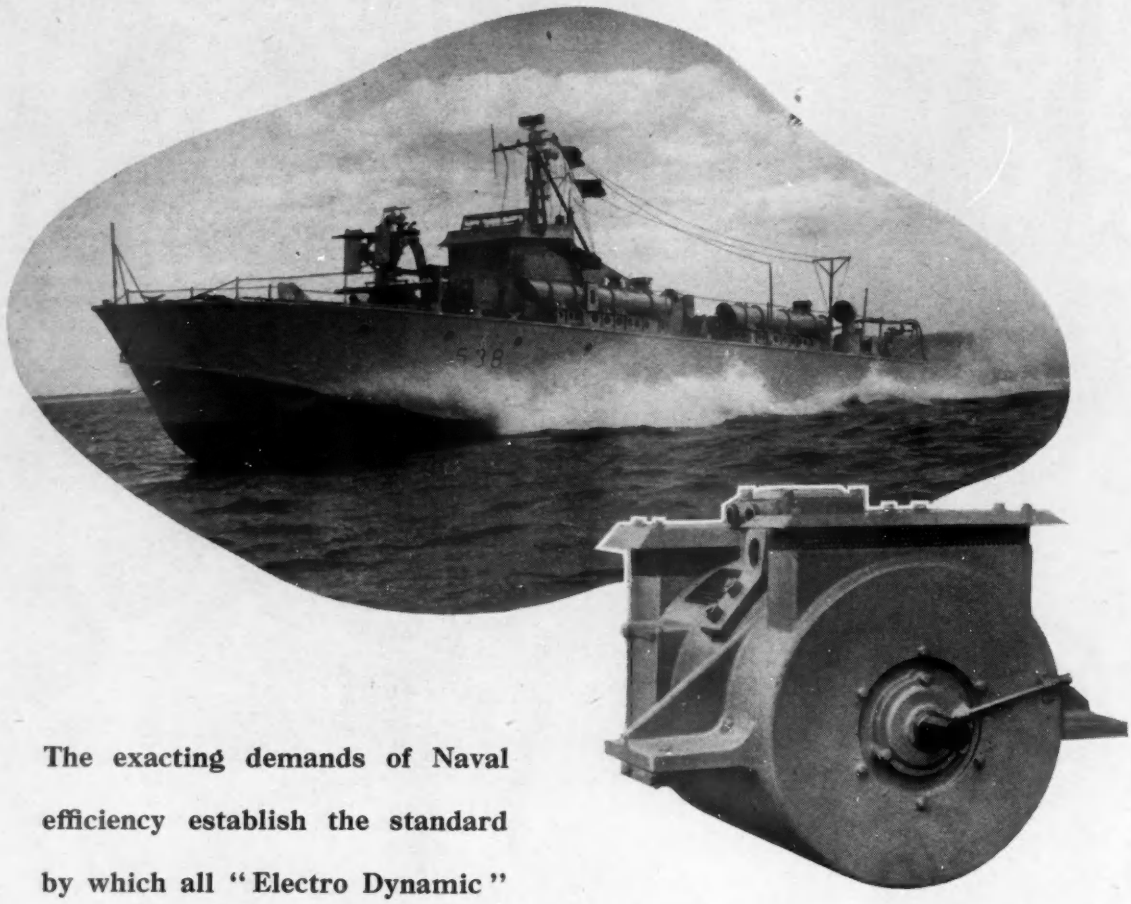

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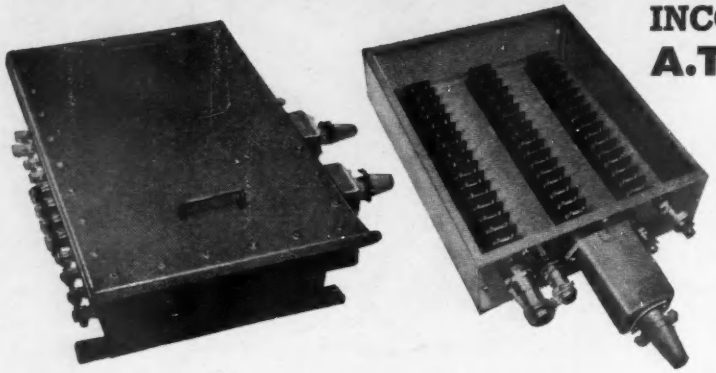

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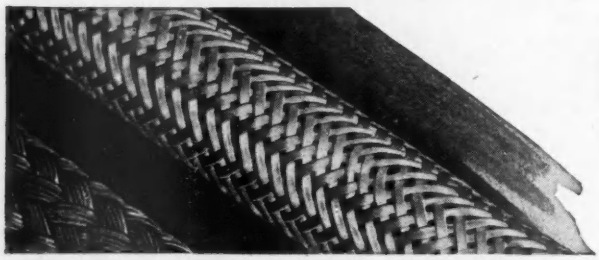

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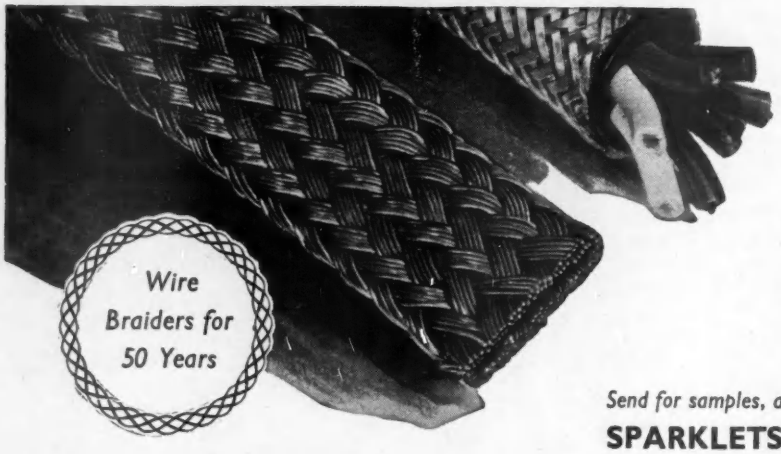

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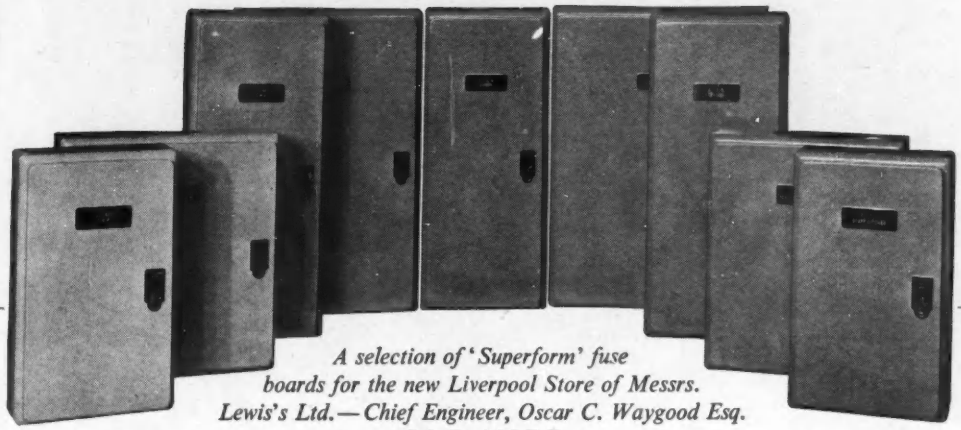

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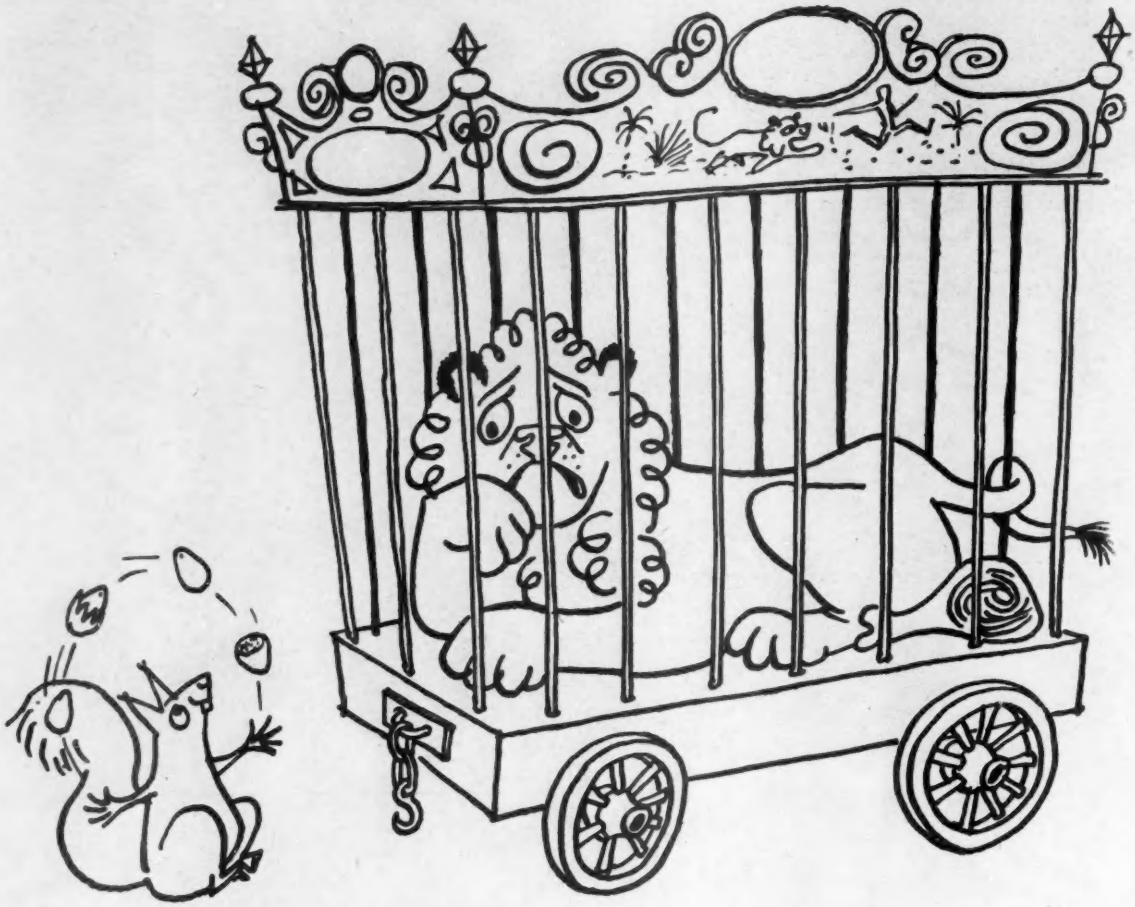

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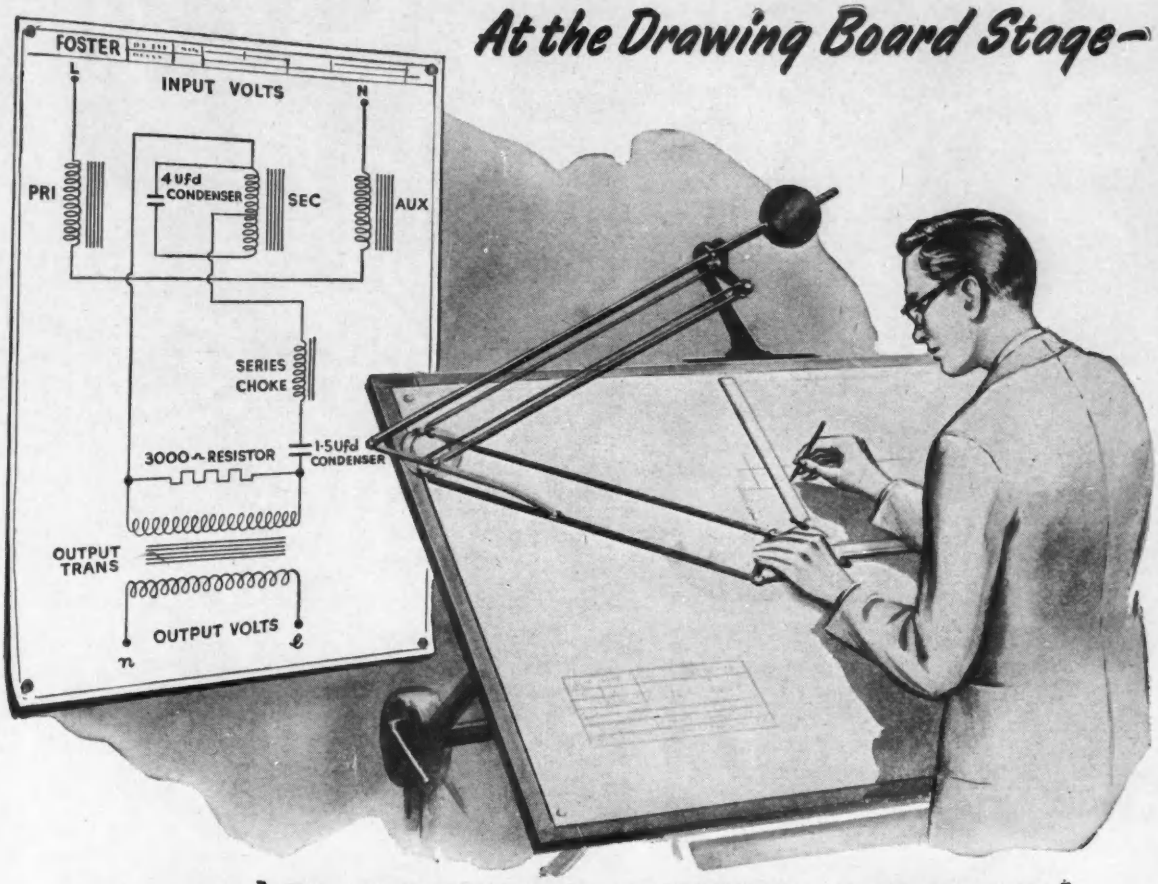

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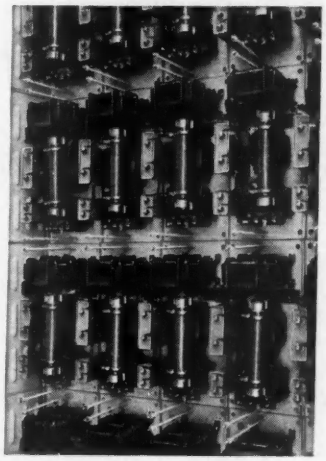

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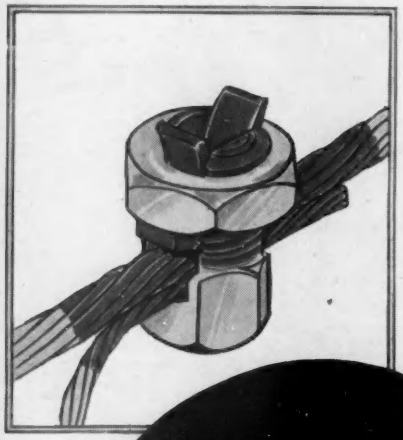

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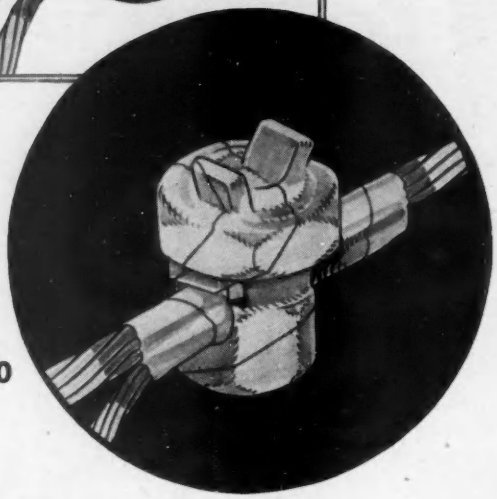

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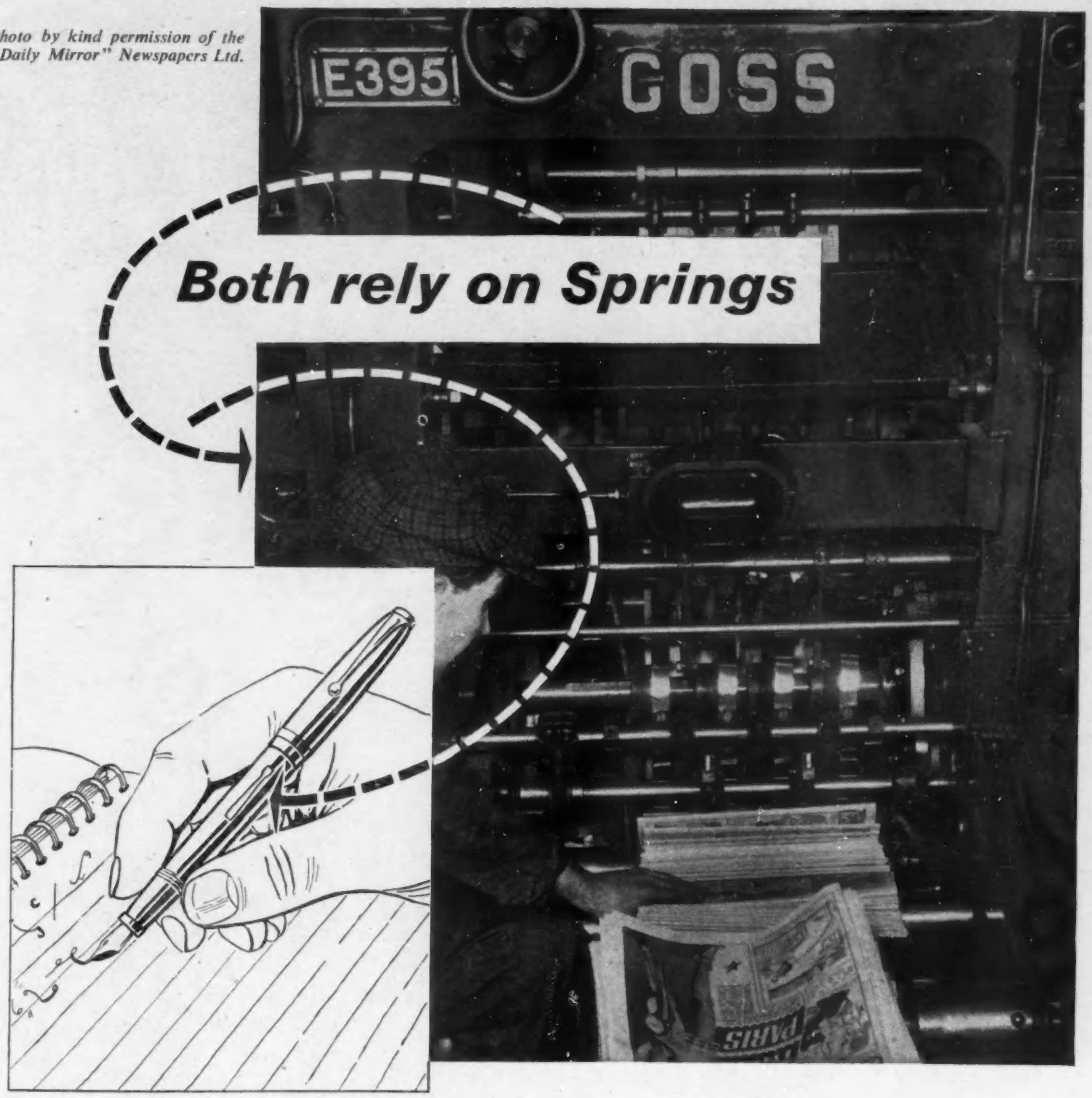

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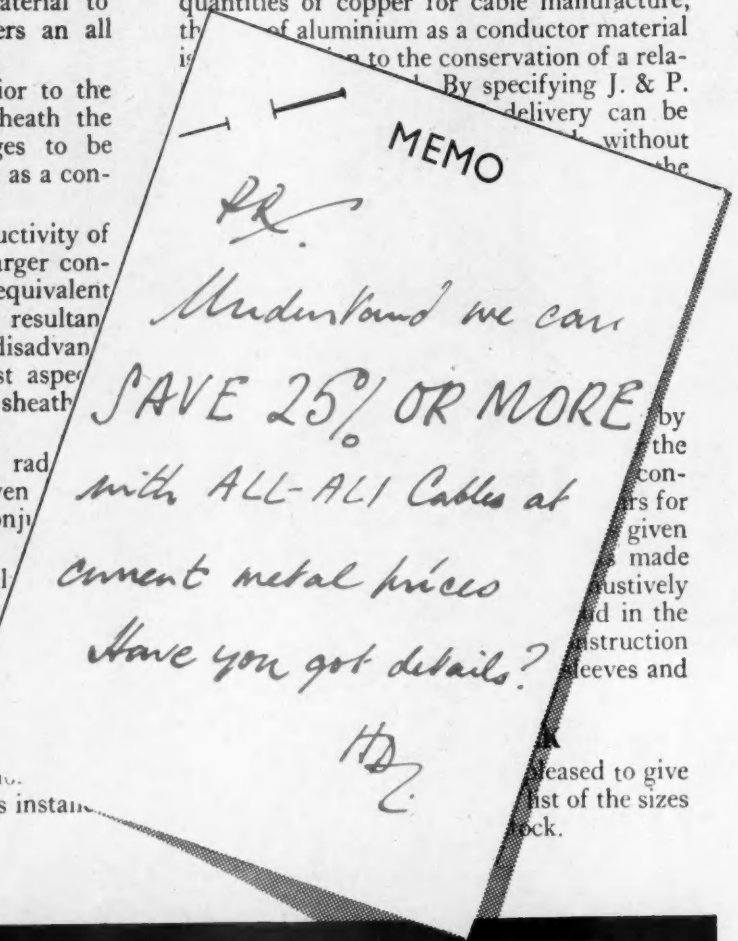

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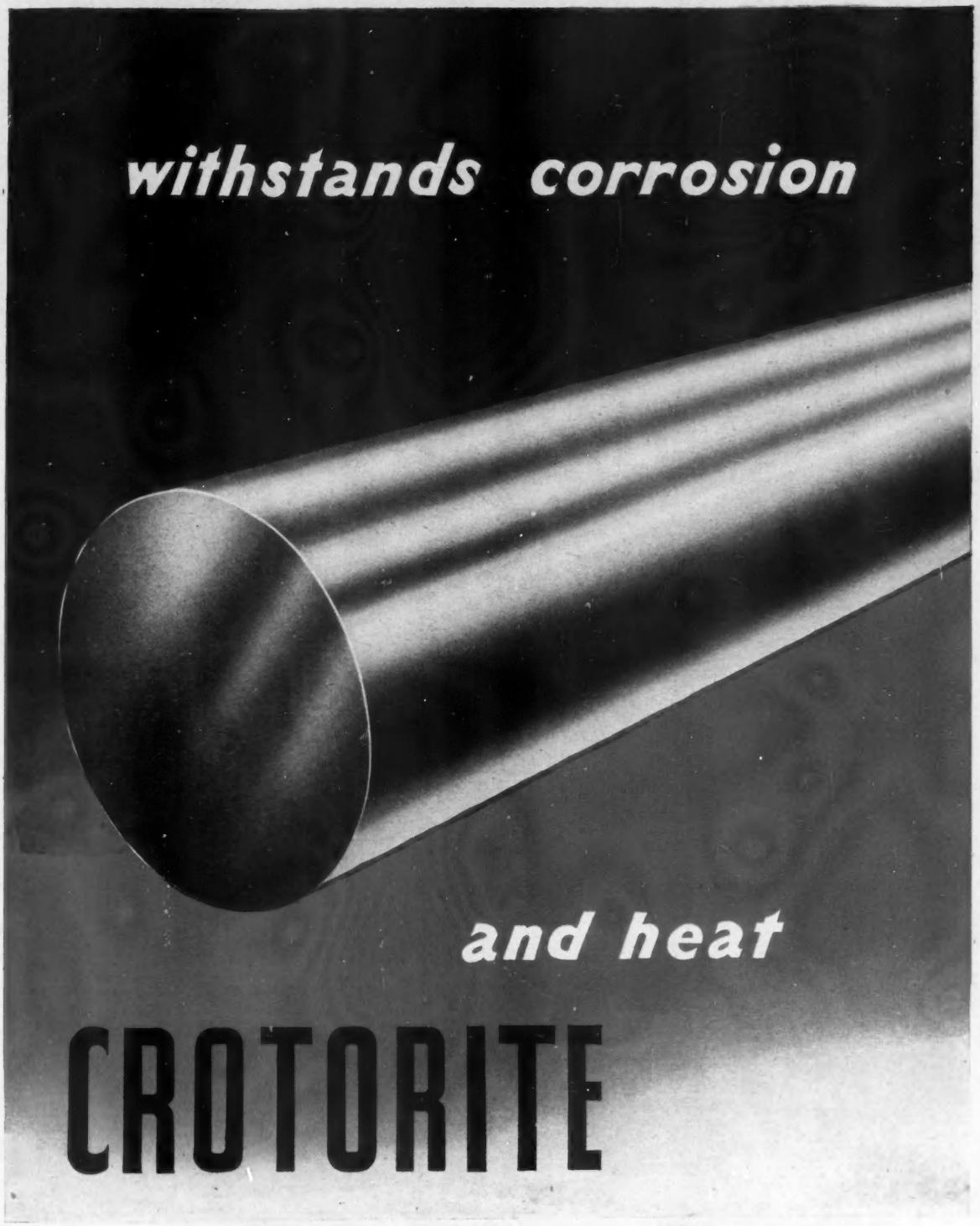

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British Legion · Haig's Fund · Pall Mall · London · S.W.1

(Registered under the War Charities Act, 1940)

This space has been generously donated by:

The British Thomson-Houston Company Ltd.
Rugby, England

VERSCO

wash boilers

new editions of a famous range

VERSCO SQUARE BOILER

VERSCO ROUND BOILER

VERSCO SQUARE DE LUXE BOILER. This smart and compact boiler is fitted with castors for easy movement and is finished in cream stove enamel. The table-top in cream vitreous is an attractive feature.

VERSCO ROUND BOILER. Obtainable in Galvanised finish as shown (a most durable finish of special appeal for Corporation and other housing schemes) or in cream stove enamel.

THESE FEATURES ARE COMMON TO ALL VERSCO MODELS: Heavily tinned 10 GALLON copper container —Double pole 3 heat rotary switches A.C. or D.C. (safety cut-out available if required)—Chromium plated taps with heat-resisting handles—Six 500 W clamp-on elements give maximum loading of 3 Kw.—Top surrounds in die-cast aluminium and pressed aluminium loose lids for easy access.

Send for new leaflet giving full specifications and prices.

SWIRLUX

WASHING MACHINES

500H MODEL heats the water, 6 lb. dry weight capacity, 12" wringer which folds down when not in use. Exclusive Swirlux agitator. (Unheated version 500 MODEL also available.) 503 MODEL— 10/11 lb. dry weight capacity, full size power wringer with five working positions. Exclusive Swirlux agitator. Power pump and hose for quick emptying. For full details send for Swirlux Leaflets.

Universal Boilers & Engineering Co. Ltd., Fulledge Works, Burnley, Lancs.
TELEPHONE: 3121 and 3203

Why do they choose

'BICALEX' WINDING WIRES?

ANY OF THE LEADING MANUFACTURERS OF ELECTRIC MOTORS USE 'BICALEX' WIRES

'Bicalex' Winding Wires give you all the well-recognized advantages of standard enamel winding wires, plus special advantages of their own. Some of these are listed on the right.

If you have any of the following jobs on hand you will find these wires of particular interest.

- High-speed winding and applications where the fitting of preformed coils involves the possibility of mechanical damage.
- Windings where space is limited or coil size must be a minimum.
- Windings which are to be impregnated with quick-drying synthetic varnishes of high bonding strength.
- Dry unimpregnated windings which may be subject to high humidity.

The dielectric strength of 'Bicalex' Winding Wires fully satisfies the requirements of B.S.1844. For fuller information write for Publication No. 322.

Brook Motors Ltd., Huddersfield, use large quantities of 'Bicalex' Winding Wires. The illustration shows a stator being wound with 'Bicalex' coils at their factory.

BECAUSE

THEY'RE TOUGH—to withstand rough handling

High speed winding and its attendant rigours do not harm them. They can be stretched, twisted and even flattened without the insulation being damaged.

THEY'RE EXTREMELY FLEXIBLE

A wire may be wound round itself without the covering cracking. Operators like them for hand wiring jobs.

THEY RESIST NEARLY ALL VARNISH SOLVENTS

The use of 'Bicalex' Wires considerably extends the range of impregnating varnishes that may be used.

THEY WITHSTAND 110°C WITHOUT "AGEING"

Though 'Bicalex' coverings come under the category of Class "A" (organic) insulation, prolonged exposure to this temperature produces no "ageing" effect.

THEIR COVERING WILL NOT "TUBE"

The covering of 'Bicalex' Wires adheres completely to the conductor, thus guarding against damage by "plucking", or "tubing" on elongation

THEY RESIST CONTAMINATED AND HUMID ATMOSPHERES

Acid or alkaline atmospheres do not damage the insulation. Its breakdown strength is not lowered by exposure to high humidity.

BICC

WINDING WIRES

BRITISH INSULATED CALLENDER'S CABLES LIMITED
21 BLOOMSBURY STREET · LONDON · W.C.1

BI Callender's

On-load regulators

Operational requirements today demand close control of power system voltage. BRUSH On-Load Tap Changing Equipment has been designed to provide that facility on three-phase power and regulating transformers.

The gear is the result of many years experience in the field of utilization, and due regard has been given to those small but essential details which reduce operational maintenance to a minimum.

A traditionally British robust gear rigorously tested under conditions of load which included surge currents and voltages, it is suitable for use anywhere in the world.

Our illustration shows one of a number of 10 MVA transformers nearing completion in our works. These units—complete with On-Load Tap Changing Equipment—were supplied to the order of the British Electricity Authority.

Our technical engineers are available to give more detailed information

REMEMBER POPPY DAY

The best answer is—

TRANSFORMERS BY BRUSH

BRUSH ELECTRICAL ENGINEERING CO. LTD · LOUGHBOROUGH · ENGLAND

BIRMINGHAM · BRISTOL · CARDIFF · GLASGOW · IPSWICH · LEEDS · LONDON · MANCHESTER · NEWCASTLE · SHEFFIELD

B.41

Model 8 UNIVERSAL AVOMETER

20,000 ohms per volt *plus* AUTOMATIC Overload Protection

Produced in response to a demand for a high sensitivity version of the world-famous Universal AvoMeter, this model incorporates the traditional design features of its predecessors, so highly valued for simplicity of operation and compact portability.

It has a sensitivity of 20,000 ohms per volt on all D.C. voltage ranges and 1,000 ohms per volt on A.C. ranges from 100 V upwards. A decibel scale is provided for audio frequency tests. In addition, a press button has been incorporated which reverses the direction of current through the moving coil, and thus obviates the inconvenience of changing over test leads when the current direction reverses. It also simplifies the testing of potentials, both positive and negative, about a common reference point. A wide range of resistance measurements can be made using internal batteries, separate zero adjustment being provided for each range.

It is of importance to note that this model incorporates the "AVO" automatic cut-out for protection against inadvertent overloads.

Size 8¼" x 7½" x 4½"
Weight 6½lbs. (including leads)

£23 : 10s.

For your Valve Characteristic Meter or Valve Tester

Owing to the very large number of valves which have been issued within the last two years, no further amendments will be issued for the original "AVO" Valve Testing Manual. A new, completely revised and fully up-to-date Valve Data Manual is now available from the Company at 15/- post free.

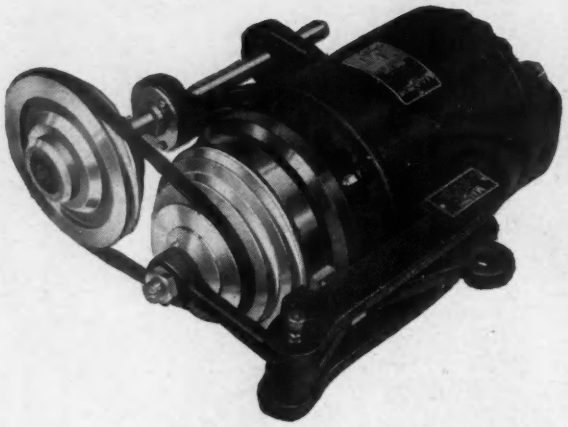
D.C. VOLTAGE	D.C. CURRENT	A.C. VOLTAGE	A.C. CURRENT	RESISTANCE
2·5V.	50μA.	2·5V.	100mA.	*First indication* 0·5Ω.
10V.	250μA.	10V.	1A.	*Maximum indication* 20MΩ.
25V.	1mA.	25V.	2·5A.	0—2,000Ω { using internal batteries.
100V.	10mA.	100V.	10A.	0—200,000Ω { using internal batteries.
250V.	100mA.	250V.	—	0—20MΩ { using internal batteries.
1,000V.	1A.	1,000V.	—	0—200MΩ { using external batteries.
2,500V.	10A.	2,500V.	—	

THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.
WINDER HOUSE · DOUGLAS STREET · LONDON S.W.1 *Telephone* VICtoria 3404—9

MARDRIVE REG'D

THREE-SPEED COUNTERSHAFT UNIT

For rapid starting and stopping at 950 R.P.M. 1,425 R.P.M., 2,250 R.P.M.



This specially designed unit giving countershaft speeds of 950, 1,425 and 2,250 r.p.m. has many applications in a wide range of trades and industries. For small lathes, coil-winding machines, film processing equipment, etc., this simple compact unit is invaluable, incorporating as it does the MARDRIVE Clutch Motor, giving rapid starting and stopping for short and frequent intervals.

Also available with Motor and three-speed Countershaft Unit mounted on base plate, allowing simple adjustment of belt and primary drive. For use with D.C. or A.C. single and three phase mains. Supplied with direct foot treadle or Standard 4 ft. Bowden cable control, as is the case with all types of MARDRIVE Clutch Motor Units.

The MARINE ENGINEERING COMPANY (STOCKPORT) Ltd
BULKELEY STREET · EDGELEY · STOCKPORT

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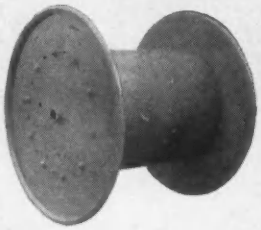
AND STEEL

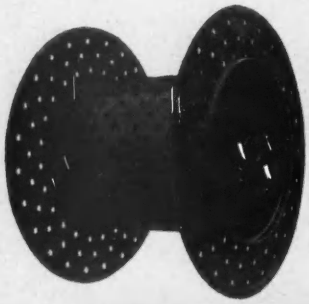
REELS

OF EVERY



KIND

FOR THE ELECTRIC WIRE AND CABLE TRADE



Makers of all kinds of wood and steel reels for the electric wire and cable trades.

Our speciality:-Steel flanges with very strongly beaded edges in a wide range of diameters, and friction rings made wholly from mild steel.

REELS LIMITED

BYRON STREET PRESTON : 'PHONE : 3922

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CHOOSE PIRELLI-GENERAL *cables*

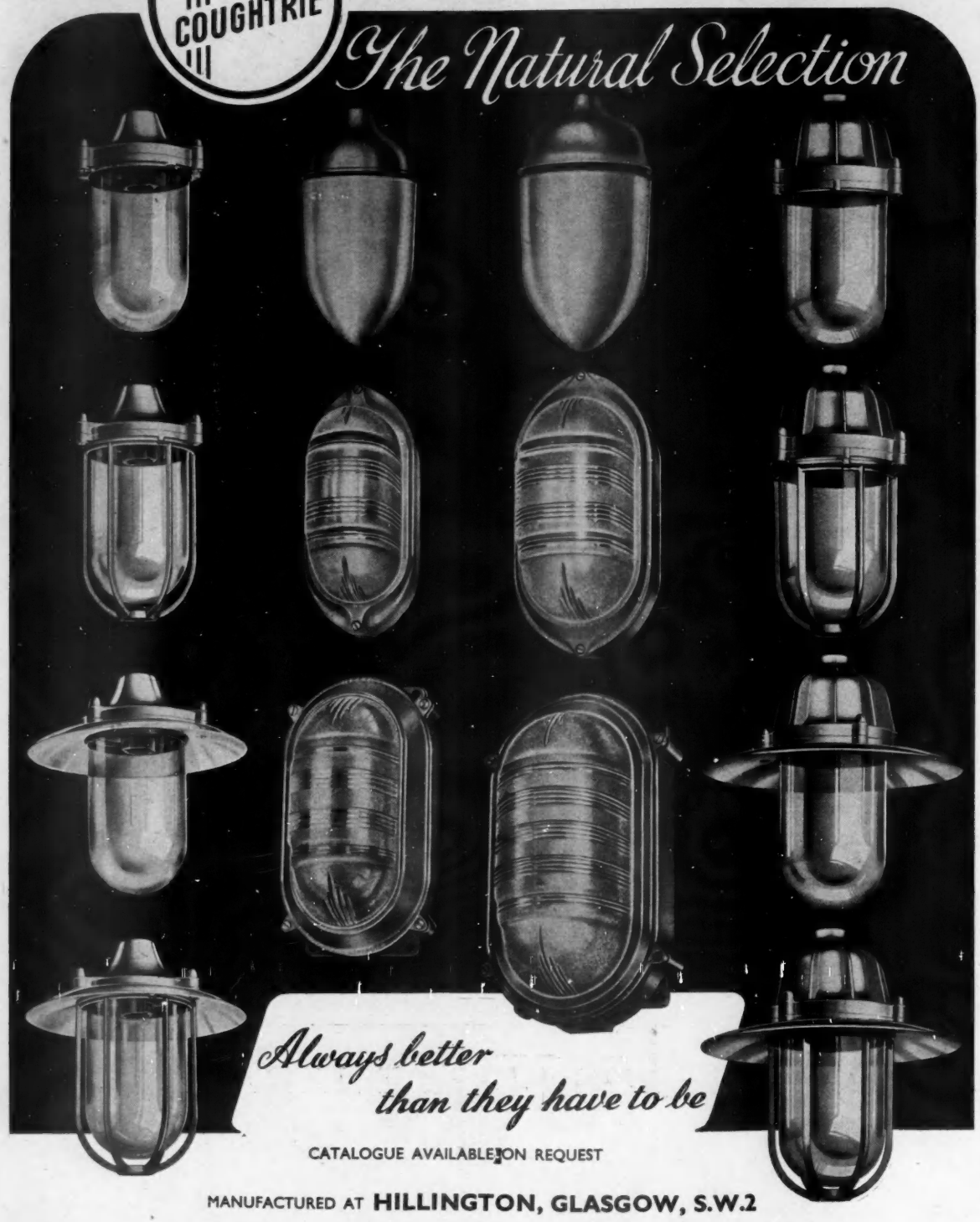
AND ORDER FROM THE *G.E.C.*

THE GENERAL ELECTRIC CO. LTD · MAGNET HOUSE · KINGSWAY · LONDON · W.C.2

COUGHTRIE

FITTINGS

The Natural Selection



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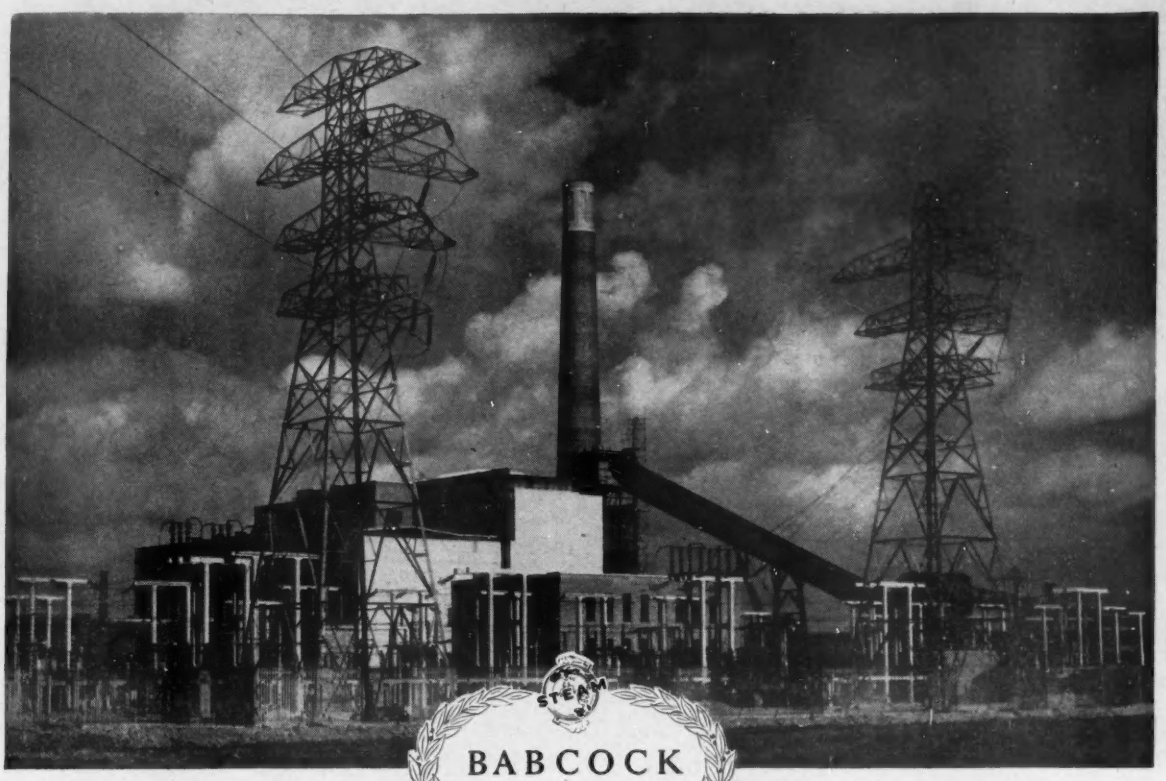
MANUFACTURED AT **HILLINGTON, GLASGOW, S.W.2**

by **J. & G. COUGHTRIE Ltd.**



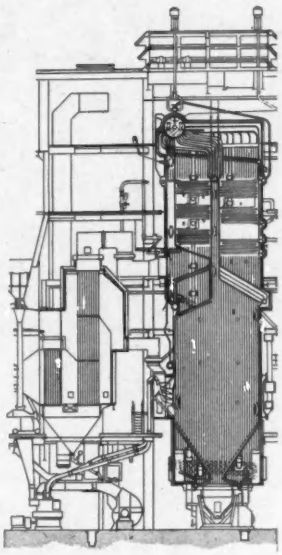
BABCOCK

CARRINGTON POWER STATION

B.E.A. NORTH WESTERN DIVISION

The Babcock boilers at the new 240 MW. Carrington power station are Radiant units, each with an evaporation of 360,000 lb./hr. at 940 lb./sq. in. and 920°F., and fired with pulverized coal by means of eight horizontal intertube burners.

The contract includes all the coal pulverizing plant, comprising 28 Babcock type E mills to feed seven boilers.



Ash, collected in the 'A' type water-filled hoppers is discharged to sump by the "*Hydrojet*" system, being pumped to settling ponds by "*Hydroseal*" ash pumps. Dust is extracted from the precipitator and air-heater hoppers by the "*Hydrovac*" system. All this is Babcock equipment, widely used in both power station and industrial installations.

Babcock & Wilcox, the world's largest manufacturers of steam-raising plant, offer to steam users large or small a comprehensive, world-wide service embracing everything for steam generation from fuel handling to ash and dust disposal.

Remember

Poppy Day

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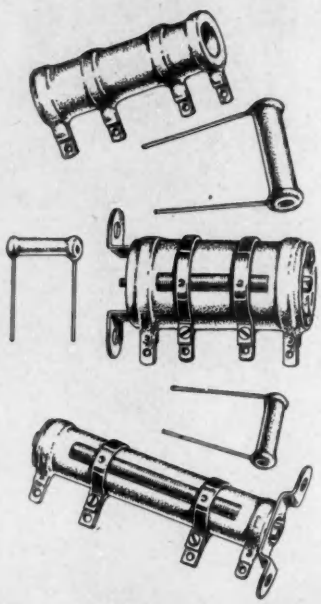
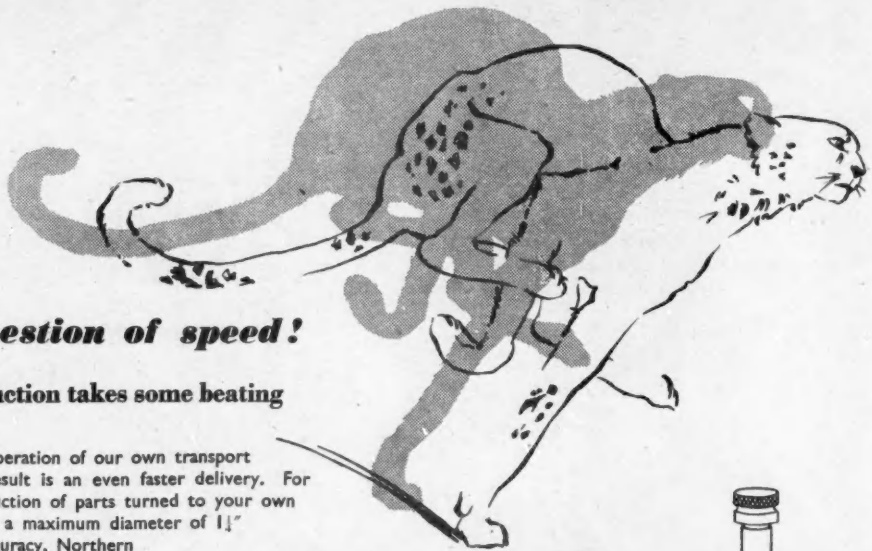
WIRE WOUND RESISTORS

C.R.M. resistors are wound on high grade low loss ceramic tubes. They can be coated with — Silicone Resins — Vitreous enamel or Cement with terminations to suit customers requirements.
C.R.M. resistors have a low temperature Co-efficient of resistance, are of robust construction and can be used under conditions where reliability and stability are important factors.
Good delivery — Low prices.
We shall be pleased to quote for your requirements.



COMMERCIAL RESISTOR MFG. Co. LTD.
MARSH ROAD, PITSEA, ESSEX
Telephone: VANGE 2[illegible]



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24 hour production takes some beating

Add to this the operation of our own transport service and the result is an even faster delivery. For the quantity production of parts turned to your own specification up to a maximum diameter of 1¼" with consistent accuracy, Northern Automatic are the people to see.

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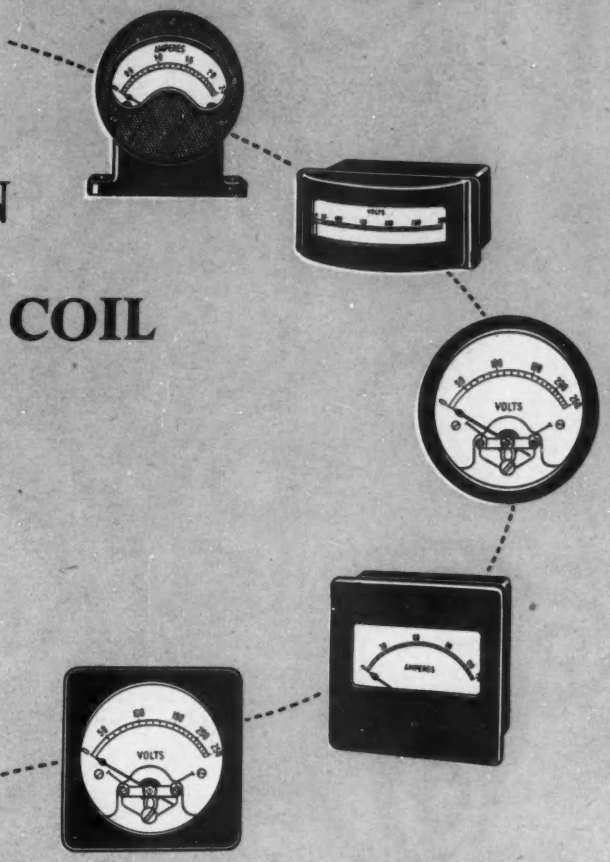

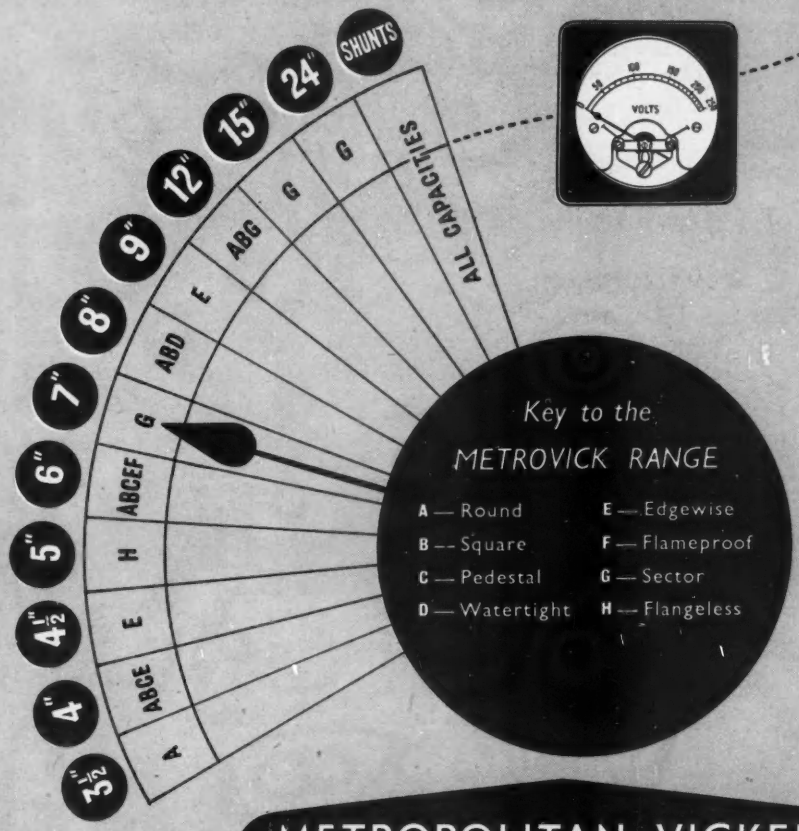

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ELECTRICAL CO LTD · TRAFFORD PARK · MANCHESTER, 17

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Instruments for all Electrical Measurements

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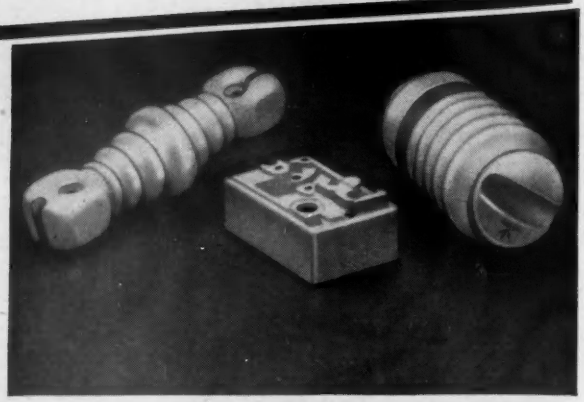
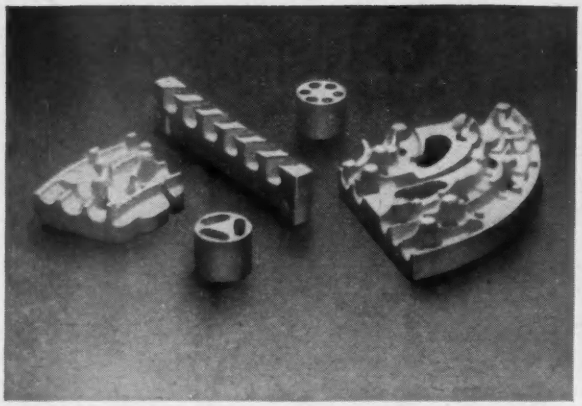
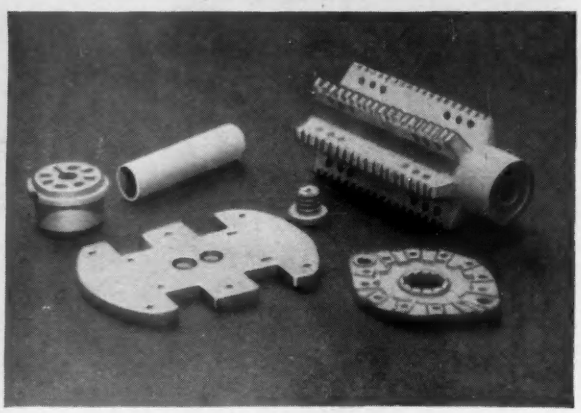
Bullers CERAMICS

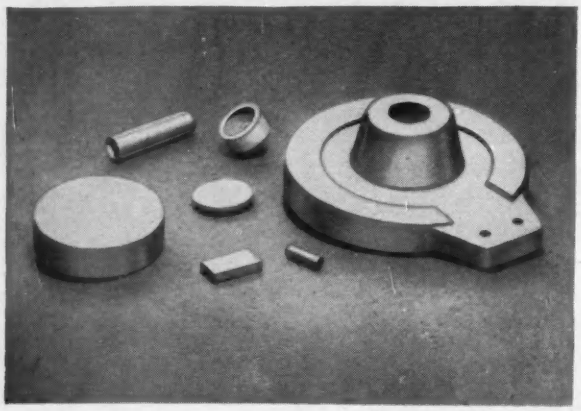
FOR INDUSTRY

High quality material and dimensional precision are attributes of Bullers die-pressed products.
Prompt delivery at competitive prices.









We specialise in the manufacture of

PORCELAIN
for general insulation

REFRACTORIES
for high-temperature insulation

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for high-frequency insulation

PERMALEX & TEMPLEX
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The wide range of EKCO quality lighting equipment includes tungsten lamps for all purposes and Ekco double-life fluorescent lamps of all colours and sizes—of which the high efficiency *Ekco White* is an outstanding example.

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NEW DESIGN · COMPACT
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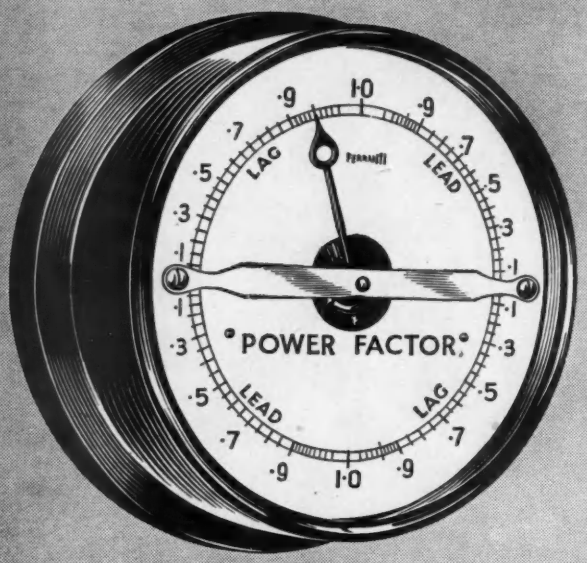
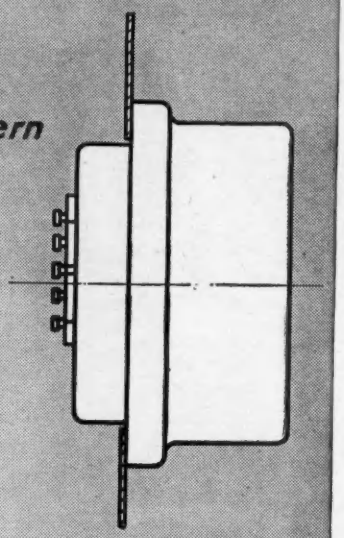


Round Pattern



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This is one of the new Ferranti Power Factor Meters. Shallow pressed steel case. Balanced or unbalanced load. Small V.A. burden. 4″, 6″ or 8″ round or square dial, semi-projecting or flush mounting. Other recently designed Ferranti switchboard instruments with features similar to the above include ammeters, voltmeters, wattmeters and frequency meters. All types are also available in hermetically sealed cases.

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FERRANTI *Switchboard Instruments*

FERRANTI LTD · HOLLINWOOD · LANCS · ENGLAND

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Jackson present

VALUE FOR MONEY in the 'TWO-NINE-THREE'

£27 . 10s

(Leg model)

(including splashplate, 'Simmerstat' on 8" plate.)

A new design for a new age!

The Jackson 'Two-Nine-Three' is a large 3-plate low-priced family cooker that your customers will want and can afford.

- **Extra Large hob** *with plenty of draw-off space—takes eight to nine saucepans, 8" plate 'Simmerstat' controlled, 6½" plate and grill boiler.*
- **Large capacity oven** *has lighter coloured enamel interior Guaranteed to cook at least a 30-lb. bird.*
- **Easy to read hand level controls.** *Brighter tell-tale light for Thermostat.*
- **Spacious Hotcupboard with door to retain heat.**
- **Easier Cleaning.** *Rollers on back legs for easy movement. Oven sides removable. Lightweight lift-off hob for easy cleaning.*
- **Built-in drying rails** *at each side of cooker.*
- **Finish.** *Cream with green relief, white with grey relief, or all cream.*

And still another extra selling feature of the 'TWO-NINE-THREE'

£28 . 10s

(Drawer model)

The 'Two-Nine-Three' can also have the added attraction of a drawer for storage of utensils underneath the oven. The drawer is completely removable to make cleaning underneath quick and simple.

For satisfaction— sell them Jackson

The Jackson Electric Stove Co. Ltd.,
143, Sloane Street, S.W.1

Assembling the unknown quantity

Some people think all electric motors are alike. They argue that standard parts and standard specification mean standard performance. But they overlook the fact that there's no specification laid down for manufacturing skill and design experience. Motors which incorporate these factors give years of service at full output.
EVERY Howells motor has that pedigree. Each one possesses built-in QUALITY—which means trouble-free service and minimum depreciation. If dependable electric motivation is of interest to you, why not write to-day for information on the HOWELLS range?

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Many famous names are included amongst the users of our patented cable trunking.

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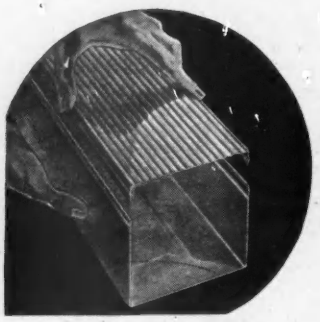
CHANNEL "Spring Capped" CONDUIT



If you would like to know about the many advantages of Channel Conduit please write or 'phone for descriptive pamphlet R.A.14.

Sizes stocked: 4 × 4, 4 × 3, 3 × 3, 3 × 2, 2 × 2, 2 × 1, 1 × 1, and 1 × ½.

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When there is a choice between a British-made product and a foreign equivalent, there are obvious advantages in buying the home-produced article.

In the matter of base metal thermo-couple wires there is one very sound reason for using the British-made 'T1/T2', in that every operation in the manufacture of these wires, from the initial melt to the final product, is carried out at the same plant. Only in that way can there be, at every stage, a precise control of quality.

'T1' (nickel chromium) and 'T2' (nickel aluminium) have been developed to operate at temperatures up to 1,100° C.

For lower temperatures 'Special Advance' alloy is supplied for use with copper up to 500° C. and with iron up to 900° C. to users' individual requirements.

'T1/T2' and 'Special Advance'

BRITISH DRIVER-HARRIS CO. LTD

MANCHESTER 15

Nickel and Nickel Alloy Specialists:—for furnace elements, domestic appliances, thermo-couples, telecommunications, lamps, spark plugs, fine wires, etc.

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NEW ELECO "PERSPEX" FITTING FOR INDUSTRIAL CONDUIT LIGHTING

—Increases Light Output Ratio 10-15%

This new Eleco fitting (patent applied for) is efficient, versatile and economical. It can be used either open, or made completely dustproof with a diffusor cover. The reflectors are made in two grades of opal 'Perspex', whilst the covers are obtainable in three grades, including a pinspot pattern "Perspex". This means that a suitable combination can be arranged to control the percentage of upward light and brightness over a considerable area. Thus, units can be selected to give the best lighting effect for your particular installation.

TOTAL THESE FEATURES— AND YOU GET TODAY'S MOST EFFICIENT LIGHTING

For 100 to 500 watt tungsten Lamps, 80-125 watt MB/V Mercury.

Lighting output Ratio exceeds 85%. Balanced distribution— 10-25% upward light.

High mechanical strength— Resists corrosion.

Low initial cost.

Ease of installation.

White stove enamelled interior.

For further particulars or help on any lighting problem write to:

ELECO

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SPHERE WORKS, ST. ALBANS, HERTS.

REMEMBER —WARDS MIGHT HAVE IT

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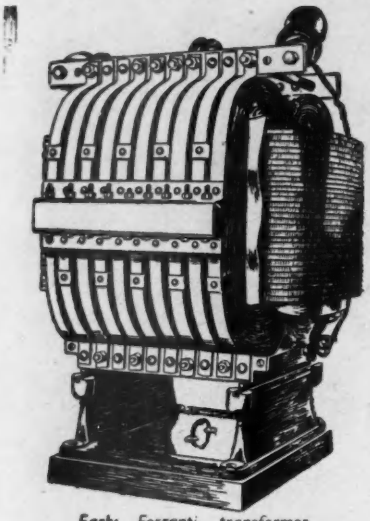

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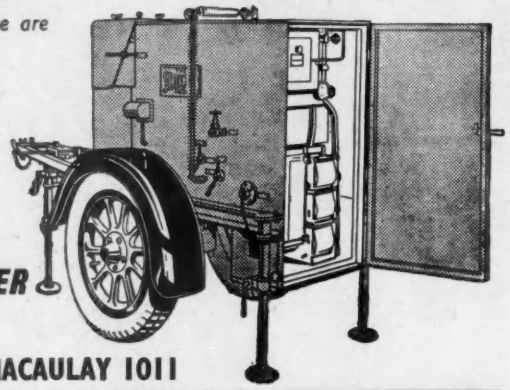

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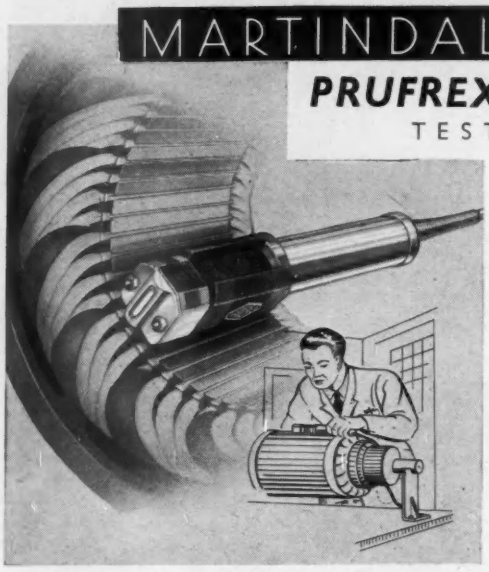

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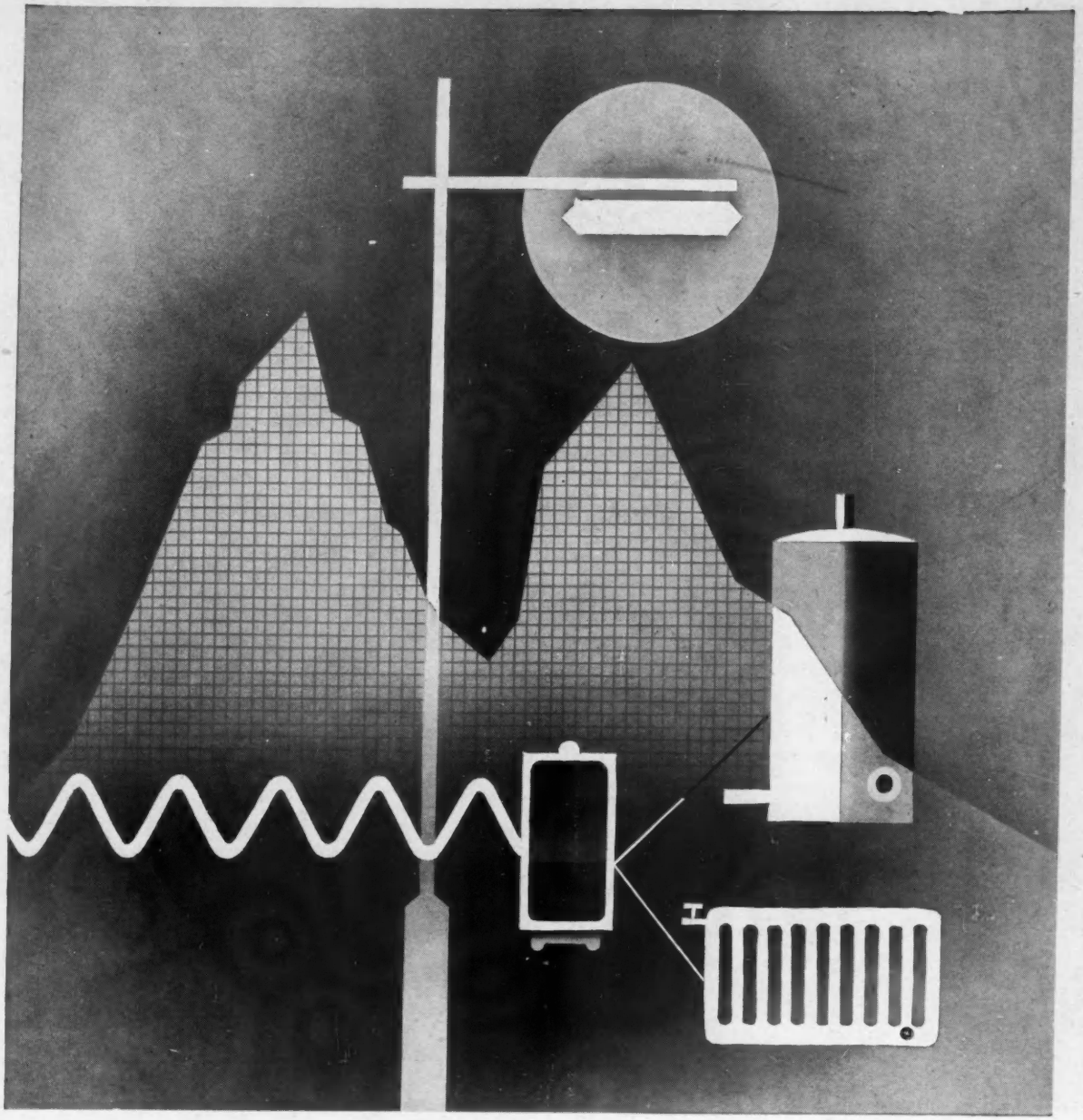

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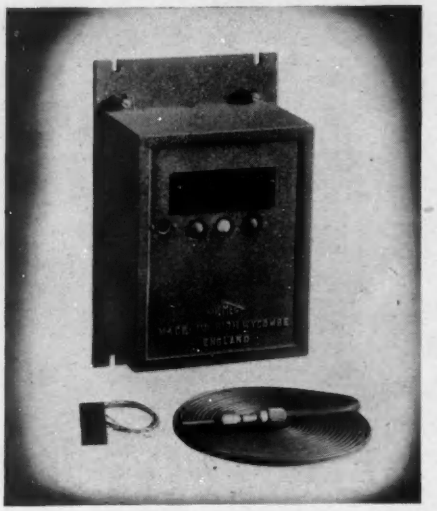

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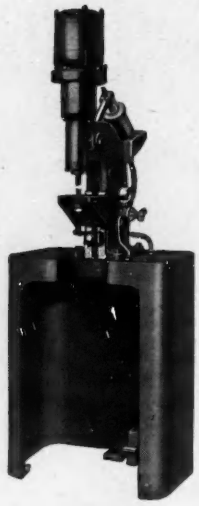

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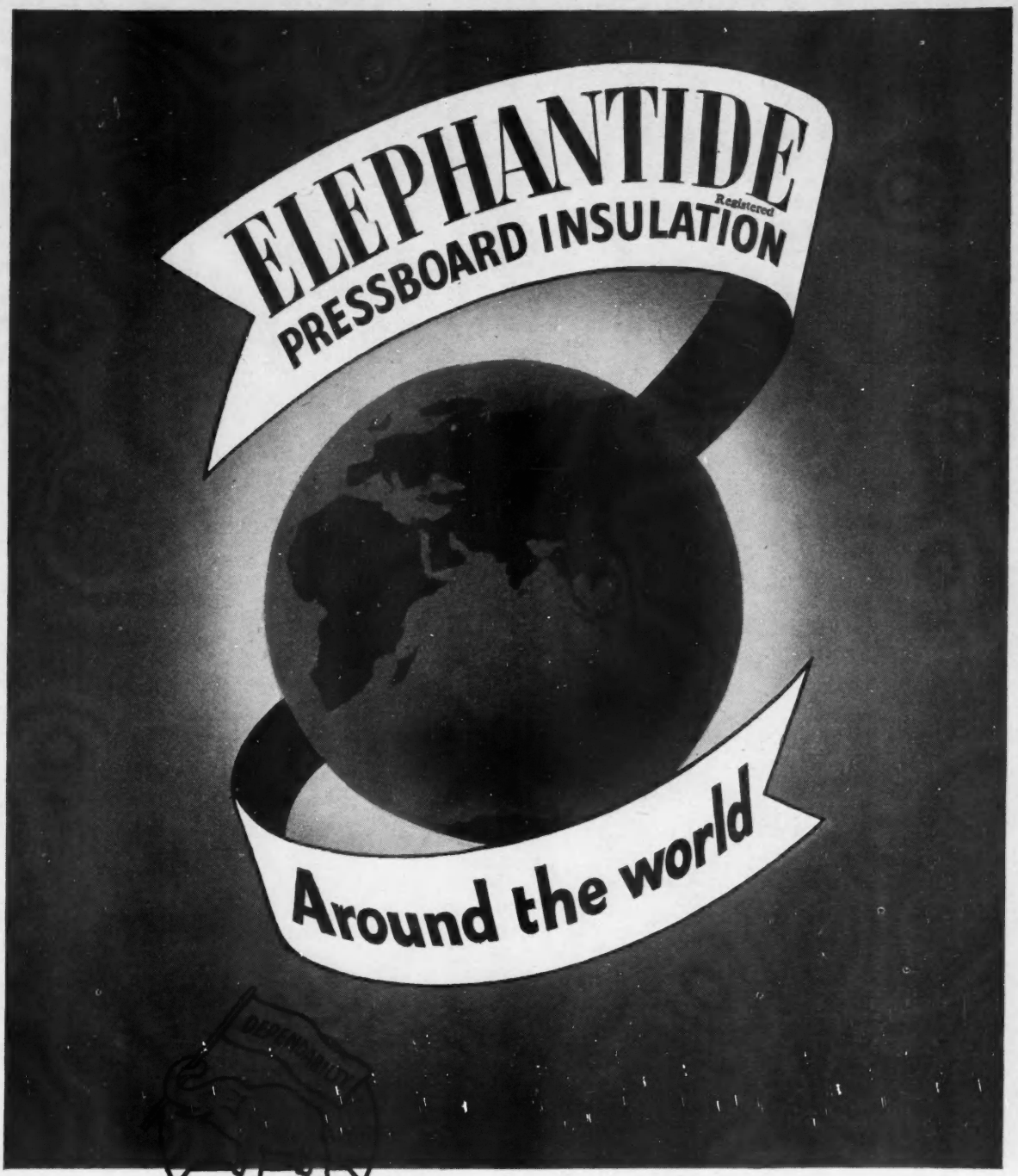

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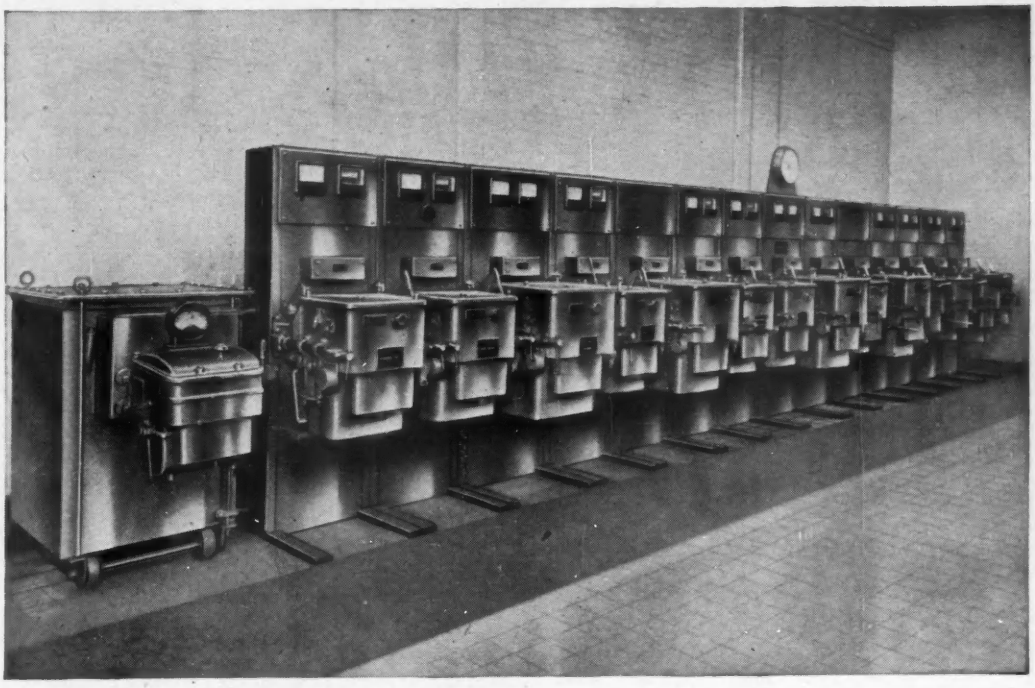

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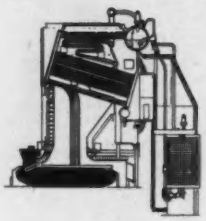

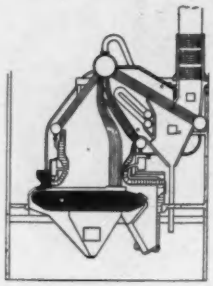

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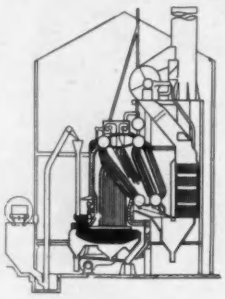
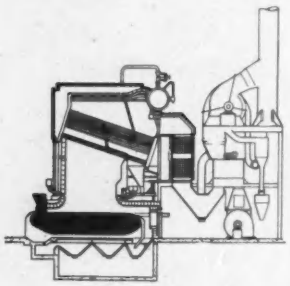
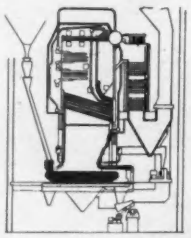
For every known design and size of water-tube boiler there is a highly efficient 'L' type travelling grate stoker.







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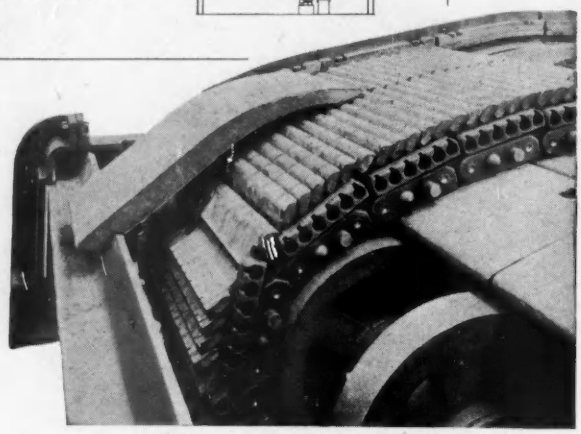

View of the rear end of an 'L' type travelling grate stoker

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ELECTRICAL TIMES

ESTABLISHED 1891

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D

HOLDING THE RING

The Electrical Fair Trading Council came into being twenty-one years ago this week, a result of prolonged striving for agreement between the conflicting interests of the several electrical trading groups. Six years of tedious negotiations had proved necessary, and even after this one important partner, the supply industry, preferred to remain outside the Council, though it aided the effectiveness of the experiment by accepting in principle the agreed fair trading policy. On this hard won and seemingly uncertain foundation has been built twenty-one years of success in displacing the law of the jungle from electrical trading, and substituting an orderly pattern of closely defined discount classes and a written code of trading ethics. Moreover, this has been achieved on a basis of voluntary agreement. There was consideration over many years of the advantages to be gained from requiring supporters of the policy to sign an agreement to abide by its terms, but such ideas have now been abandoned. So it is that the Fair Trading Council comes of age a respected institution in the British electrical industry and beyond; honoured, indeed, by the flattery of imitation in Australia, New Zealand and South Africa. It may be, however, that the Council's greatest trials and most significant successes lie still before it. The immediate post-war years saw relatively little advantage offered by price-cutting and discount snatching. As competition becomes sharper, the temptation to adopt such practices increases. Continued success of the Fair Trading Council in preventing any widespread move in this direction is of the greatest importance for all sections of our industry.

EASTERN OPPORTUNITY

Organisation of a great all-British trade exhibition at the heart of the once-mysterious Arabia is the greatest commercial venture embarked on by this country for many years. Its importance is appropriately marked by the attendance of H.M. King Feisal of Iraq to perform last Monday's ceremonial opening: less romantic are the columns of trade statistics for the region, but they reinforce this impression of British and local interest in developing mutual trade. Iraq itself, in the first nine months of the present year, imported £18·8m worth of goods from this country, of which £2·0m consisted of electrical machinery apparatus and appliances, while not far behind comes neighbouring oil sheikhdoms and sultanates with Kuwait taking £8·5m (£1·1m electrical) and Bahrain, Qatan and Oman together a further £8·3m (£1·04m). Moreover, these totals are signs of only a beginning in modernisation and an advance in the standard of living. Kuwait

alone, in the same nine months up to the end of September this year, exported £103·6 m worth of oil to Britain: the proceeds of such trade throughout the area are for the spending. Electricity is so closely associated with modernisation and development, that electrical manufacturers have a specially direct opportunity in this Arabian revival of wealth. The Fair will give a most valuable impetus to trading with Britain: but continued attention and application will be necessary to reap a full reward, for the prize is great, and competition from both continental and trans-atlantic manufacturers will be correspondingly intense.

ELECTRIFYING OVERSEAS RAILWAYS

During the last session of the I.E.E. two papers on a.c. railway electrification were presented by Messrs. Garreau and Nouvion. One of these described four types of locomotives which were being built for use with a supply system of 25 kV, 50 c/s. Information has now been released giving some details of the performance of prototypes of three of these machines—the fourth will not be available for running until early next year. The units, one of which uses ignitron rectifiers, another single to three-phase conversion, and the third single-phase motors, have all behaved excellently. While the French must be congratulated on the bold and imaginative manner in which they have apparently solved the basic problems of a.c. electrification, the news must arouse some misgivings in the minds of British manufacturers. Many countries are in the throes of extensive development, and the low capital cost of high-voltage 50 c/s traction may make a particular appeal for marginal density routes. Although French experience at the moment is limited, that there are on order no less than 160 locomotives for one section of the railway system is a proof of confidence, and the Continental manufacturers concerned will shortly be possessed of a fund of knowledge which may be applied to their own advantage in overseas markets.

RESEARCH FOR THE INDUSTRY

Fundamental and applied research are of vital importance to continuing British industrial prosperity. This has long been recognised by the electrical industry, and many millions of pounds have been spent in the setting up of private research establishments. But in addition, the value of co-operative research has been appreciated as is shown by the creation of the Electrical Research Association, one of the earliest organisations of its type to be founded. From small beginnings in 1917 the range and scope of the Association's activities have increased, and have outgrown successively the Acton Lane and Perivale premises. Plans were therefore made in 1943 to build new laboratories on a site at Leatherhead. The original scheme, involving the expenditure of some £1m, had subsequently to be modified to come within the limits of £400,000. As a consequence of the lesser space to be made available work will now have to continue at Perivale and Thorncroft Manor. Only a small sum of money remains to be raised to ensure the completion of the present restricted scheme, and this will undoubtedly be readily forthcoming from the industry. It is, nevertheless, to be hoped that some way will be found to enable the full project to go ahead in the immediate future.

UNIT OF PRODUCTIVITY

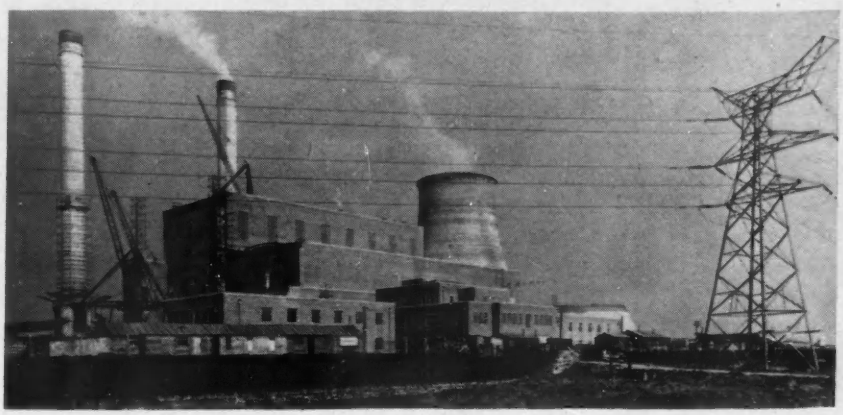
Since public concern with productivity became fashionable, there has been a great deal of talk about horse-power per worker: in particular, the discrepancy between this statistic for British industry and for American has been repeatedly commented upon. Yet what does this figure mean? To some extent, it may merely denote that American practice tends to over-power machines; similarly, that mass-production methods are more practicable when a home market of the American size is available. Not the least valuable section of the chairman's address which Mr J. I. Bernard last week delivered to the I.E.E. Utilisation Section, is a discussion of this question of meaning. He emphasises again that the reasons why the American operative has available two and a half to three times the horse-power controlled by his British counterpart are many, and that not all of them apply on this side of the Atlantic. He suggests, too, another possible measure of the extent to which electricity is speeding-up production: units consumed per man-hour. Since the best British production practice seems generally admitted to be comparable in effectiveness with the best in America, some comparison of kWh per man-hour between various factories engaged on similar work in this country might well produce more convincing figures, which would have a valuable propaganda effect in encouraging further electrification as an aid to productivity.

CLEAN AIR IS TAXED

Every year it seems, boys in the streets ask for a remembrance of Guy Fawkes earlier than before; and there are months rather than days left for Christmas shopping when Santa Claus takes up his stand in stores and shops. The latest recruits to this race for attention are the petitioners of the Chancellor of the Exchequer who seek some revision, or better still abolition, of the Purchase Tax schedules. They are encouraged, of course, by the decision earlier this year to announce P.T. changes immediately after Christmas, rather than allow trade to languish until the budget has been presented. In the changes then made, electrical appliances benefited to a marked degree, but it would be unduly optimistic to forecast a further relief in a 1955 announcement. However, there is a factor that has increased in importance of late. Public opinion is still exercised with the problem of fog and smog in our cities; and the final Beaver Committee report on air pollution is expected to be published at any time now. This is likely to stress anew the importance of avoiding smoke and fumes from domestic appliances, and in that way, to underline the public value of electrical space and water heating. Perhaps this will weigh with the Chancellor, swaying a decision on the still heavy taxation burden which affects such appliances. It is a possibility worth working for, although renewed concern with inflation must make it uncertain if there will be any P.T. reductions at all.

Meteor

Britain's Post-War Power Stations



FURTHER DETAILS OF PLANT RECENTLY COMMISSIONED

THIS is the continuation of our series detailing the leading characteristics of post-war power stations. No less than five of the six stations concerned are of the smaller type consisting of 30 MW sets with the moderate conditions of 600 lb/sq in 825° F at the turbine stop valve and only one—Keadby—uses the higher conditions of 900 lb/sq in. 900° F.

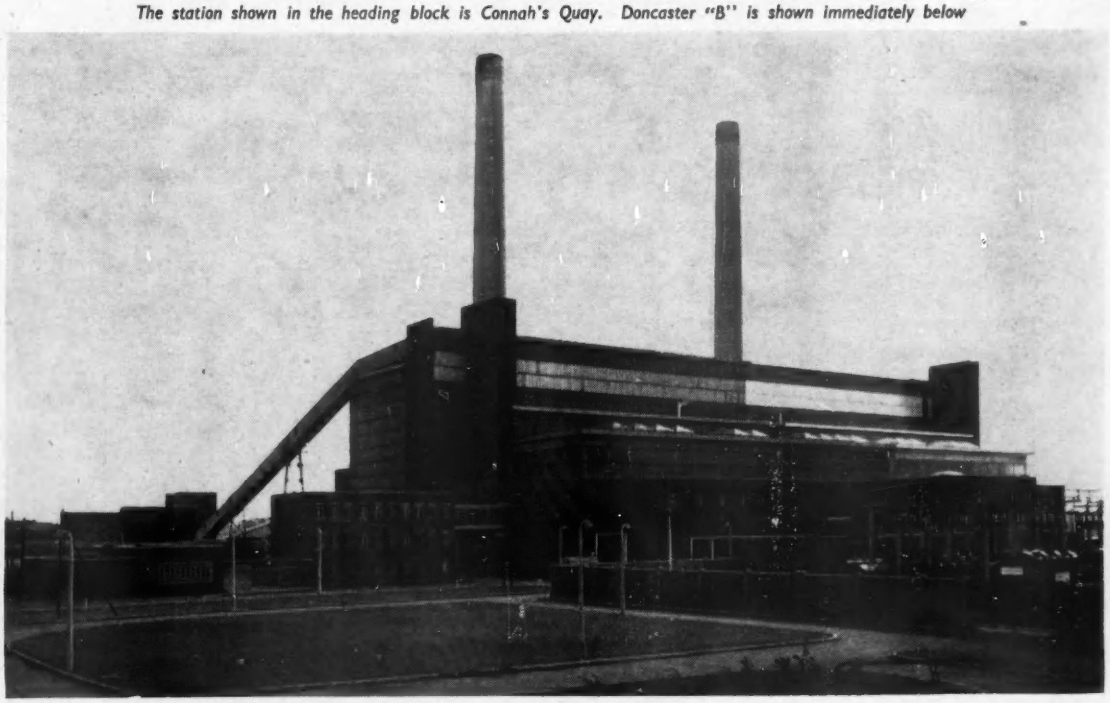
To enable comparisons to be made readily, in accordance with our usual practice we have presented the data in tabular form. Previous articles in this series were published in our issues of 12th February, 30th July and 10th December, 1953. To date the stations which have been covered include Brunswick Wharf, Rye House, Plymouth "B", Huncoat, Bromborough; Skelton Grange, Brighton "B," Littlebrook "C," Uskmouth, North Tees "C"; Barking "C," Bankside "B," Nechells "B," Westwood and Carmarthen Bay. Although the term "post-war" is applied to the stations, in some cases the original planning was carried out in pre-war years. Construction and initial commissioning, however, took place after the war.

Acton Lane "B"

Situated in the North Western section of London is Acton Lane "B." This new station is mainly remarkable for the extensive use of pre-cast concrete in the construction of the turbine house, switch house and administrative offices. A description of the structural techniques adopted was given in our issue of 17th January, 1952.

The station is designed to replace the original "A" station, one of the pioneer London power stations having been first commissioned in 1899. Six turbo-alternators, each of 30 MW capacity are to be installed and the first of these was commissioned in June of this year; the second is expected to follow early in 1955. The station is operated by the London Division. The thermal efficiency is expected to be about 25·5%.

The station shown in the heading block is Connah's Quay. Doncaster "B" is shown immediately below



Power Station Leading Characteristics

Name of station	Acton Lane "B"	Bold "A"	Connah's Quay	Doncaster "B"		Keadby	Roosecote
Nearest centre	Harlesden	St. Helens	Chester	Doncaster		Scunthorpe	Barrow-in-Furness
Projected capacity	6 × 30	4 × 30	6 × 30	4 × 30		6 × 60	4 × 30
Present capacity	1 × 30	1 × 30	2 × 30	2 × 30		4 × 60	2 × 30
Machine arrangement	In line	Transverse	Transverse	In line		Transverse	Transverse
System arrangement	Range	Unit (with cross-overs)	Unit	Range		Unit	Range
Boilers							
Boiler makers	Mitchell	Yarrow	International Comb.	Mitchell		Stirling	Yarrow
No. and cap., klb/hr (ult.)	9 × 240	4 × 300	6 × 300	8 × 180		6 × 550	4 × 300
No. and cap., ,, (present)	2 × 240	2 × 300	2 × 300	4 × 180		4 × 550	3 × 300
Pressure, lb/sq in.	625	625	625	625		925	625
Temperature, °F	865	865	865	865		915	865
Furnace wall, h.s., sq ft	1,915	5,610	6,015	5,880		10,850	5,610
Boiler, h.s., sq ft	25,360	3,560	18,785	17,160		5,480	3,560
Prim. s'heater, h.s., sq ft	6,710	9,420	8,700	7,900 (1–4)	6,950 (5–8)	18,650 (1–5) 15,600 (6)	10,760
Sec. s/heater, h.s., sq ft	3,000		2,334	2,050		4,200 (1–5) 6,020 (6)	
Economiser, h.s., sq ft	29,952	21,300	9,984	17,820 (1–4)	18,612 (5–8)	18,950	21,300
Air heater, h.s., sq ft	38,300	79,600	60,480	16,000		142,200	79,600
Furnace vol., cu ft	13,370	21,900	21,400	10,400		45,300	21,900
Release, BThU/cu/ft/min	403·3	300	315	390		15,550	290 (m.c.r.)
Design, C.V.	11,000	11,000	10,000	11,600 (approx.)		11,650	10,000
Type of firing	stoker (droplink)	p.f.	p.f.	stoker		p.f.	p.f.
H.P. aux. motors/boiler	1,000	1,380	1,600	1,037		3,220	597
Generating Plant							
Makers	Richardsons Westgarth	M–V.	C. A. Parsons	G.E.C. (1 & 2)	Brush (3 & 4)	C. A. Parsons	M-V.
S.V. pressure, lb/sq in.	600	600	600	600	600	900	600
S.V. temperature, °F	850	850	850	850	850	900	850
No. of cylinders	3	2	2	2	1	3	2
Type of exhaust	twin	twin	twin	twin	twin	twin	twin
No. of bleed pts.	4	4	4	4	4	5	4
Design vac., ins. Hg.	28·5	28·6	28·7	28·9	29·0	28·7 (1–3) 28·9 (4–6)	28·5
Alt. cooling medium	air	air	air	air	air	hydrogen	air
Fan drive	separate	integral	separate	separate	integral	integral	integral
Generator voltage	11·6	11·8	11·8	11·8	11·8	11 (1–3) 11·8 (4–6)	11·8
Exciter drive	direct	direct	direct	direct	direct	geared	direct
Tail-end leads	cable	cable	cable	busbar	busbar	busbar	cable
Unit transformer, MVA	3·0	3·0	3·0	3·0	3·0	6	3
Gen. transformer, MVA	32·0	36·0	36·0	36·0	36·0	75	36·0
C.W. pumps, h.p.	615/set	550/set	3,300 (total)	1,340 (total)		4,440 (total)	1,460 (total)
H.P. aux. motors/set	1,057	592	750	646	417	920	1,123
Miscellaneous							
Building area, sq ft	100,000	101,150	82,200	83,250		199,350	—
Building volume/kW	50	55·4	39·4	53·76		48·3	—
Switching voltage, kV	22	33	132	66		132	132
Main switchgear type	o.c.b.	o.c.b.	o.c.b.	air-blast		air-blast	o.c.b.
Outgoing feeders, kV	22	33	132	132 and 66		132	132
Main s/gear rating, MVA	750	750	2,500	1,500		2,500	2,500
Aux. supply source	House set and unit trans.	Unit and stn. trans.	Unit trans	Unit and stn. trans.		Unit trans.	Unit and stn. trans.
H.V. aux. supply, kV	3·3	3·3	3·3	3·3		3·3	3·3
C.W. source	canal	canal	river	River Don		River Trent	Cavendish Dock
No. of cooling towers	4 (ult.)	2	3	—		—	—
C.T. rating, gals/min	37,500	46,700	42,000	—		—	—
Coal, storage, tons	30,000	90,000	100,000	48,000		200,000	30,000
Coal transport	rail	road (future conveyor from colliery)	rail and road	canal and road		rail	rail
Ash disposal	road	hydrojet and sluice	sluice	submerged belt conveyor		hydrojet	sluice and hydrojet
Site area, acres	11·6	88	70 + 130 (reclaiming)	45		181	—

Bold "A"

Two stations, "A" and "B," are scheduled for construction at the Bold site, which lies near Manchester. The first, Bold "A," was sanctioned in 1950 and is to have a total capacity of 120 MW in four 30 MW sets. While the plant is fairly conventional, two unusual features are the use of film cooling towers and the method of coal transport. At the moment, coal is being delivered by road, but is shortly to be obtained directly from the adjacent Bold Colliery by means of a conveyor belt system. The colliery is being modernised and developed to supply both the "A" and "B" stations. The latter is scheduled for three 60 MW sets operating with inlet steam conditions of 900 lb/sq in., 900° F. Commissioning of the first 30 MW set in the "A" station took place in December of 1953. Unit operation is normal at the station, although for emergency, interconnection both of boilers and feed-water systems is possible. Complete commissioning of the "A" station is expected in 1957. Operation of the station comes under the North West, Merseyside and North Wales Division.

Connah's Quay

The building of a power station on the Dee estuary was first envisaged by Chester City Council. Now, there has arisen Connah's Quay, opened by Lord Citrine in September last. (See our issue of 23rd September, 1954). The station is designed for unit operation, and is to be completed in three stages, each of 60 MW. The sets are conventional units of 30 MW each. Although the station is located on the Dee, it was found necessary to erect cooling towers for the condenser circulating water system. Civil work in the construction proved extremely difficult due to the sub-soil conditions. An advantage of the site is that sufficient low lying land, mostly tidal saltings, has been obtained to accommodate disposal of ash and dust for an estimated period of about 20 years. The consequent making-up of the area will also have the advantage of reclaiming otherwise derelict ground for development purposes.

Present installation (Part I) consists of two 30 MW sets and the subsequent two stages are scheduled for completion in 1955 and 1957 respectively. The station comes under the North West, Merseyside and North Wales Division.

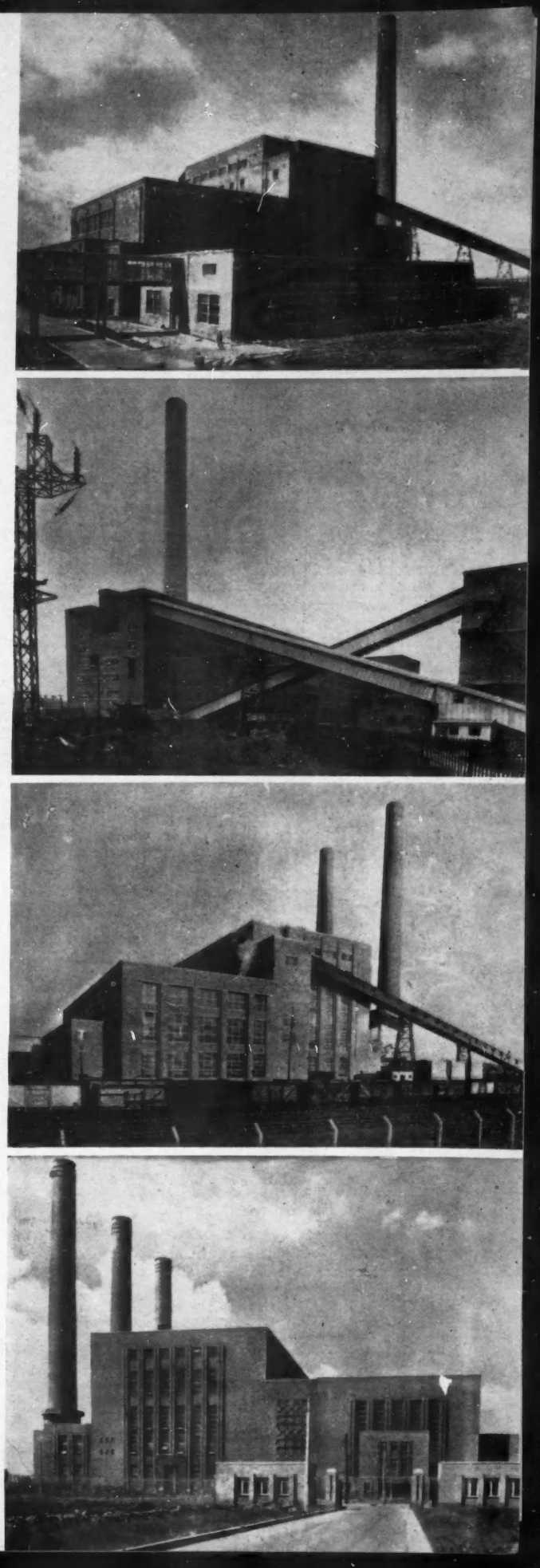
Doncaster "B"

Doncaster, in the Yorkshire Division, has an old and a new power station. The latter is designed for an ultimate capacity of 120 MW in four 30 MW sets. Here, however, an unusual feature is that two of the sets are axial flow machines and two are radial flow Ljungstrom types. The first two sets, both of G.E.C. manufacture, are now running. Another feature, which can be seen from the table, is the slight variation in boiler characteristics as far as the primary economisers and superheaters are concerned, for the two types of machine.

Externally, the station is of interest as being an example of the use of other materials, particularly glass, in place of the more conventional brick cladding.

Keadby

Keadby is one of the largest of the post-war stations and is being engineered by the Headquarters staff of the Authority. It is destined for an ultimate capacity of 360



On the right, reading from top to bottom are Bold "A", Acton Lane "B", Roosecote and Keadby. The resemblance between Bold "A" and Roosecote can clearly be seen

MW and has at the moment 240 MW installed. Steam conditions are 925/lb/sq in. at 915° F, and the station operates on the full unit principle. A description of the plant installed was given in our issue of 27th August, 1953, p. 365. The site is about nine miles from the confluence of the Trent with the Ouse and Humber. Coal of high chlorine content is being burned in the p.f. fired furnaces of the plant, and initially this provided some difficulty in operation. Most of the teething troubles have, however, been overcome. The alternators in this station are hydrogen cooled, and the main and pilot exciters are driven through gearing from the main shaft. The first set went into operation in May, 1952, followed by the second, third and fourth in November, 1952, June, 1953 and June 1954. Particular attention has been paid to the amenities in Keadby, as it is comparatively isolated except for the housing estate on which most of the employees live.

Roosecote

Last of the present series is Roosecote in the North West, Merseyside and North Wales Division. This is virtually a companion station to Bold "A," as can be seen from a comparison of the photographs of the two stations. Boilers, sets and other equipment are by the same makers and are of the same size in both cases. The station is designed for an ultimate capacity of 120 MW in four 30 MW sets. The first two sets went in in September and December of 1953.

Educating our Customers

ENGINEERS SHOULD BOOST ELECTRIFICATION SAYS I.E.E. SECTION CHAIRMAN

SIXTY years ago, COL R. E. CROMPTON, in his presidential address to the I.E.E. said that "not the lightest of the duties of the modern electrical engineer is that of educating the public in the use of electrical energy." This theme of educating the public was picked up once more last Thursday by MR J. I. BERNARD (E.D.A.), in the address which he delivered as chairman of the I.E.E. Utilisation Section. He suggests that all too often electrical engineers are so absorbed by their own problems that they do not stop to think how much help the solutions they develop may give to other people. Engineers should not merely develop new equipment: they should go on to explain to potential users exactly what the new design offers its users.

Electricity in Industry

Turning to the comparisons often made between the use of electricity in British and in United States manufacturing industries, Mr Bernard pointed out that a bald comparison such as, the American operative has between 2½ and 3 times as much horse-power as the British, cannot be used by itself as an argument that factory managers should install more or larger motors. There are many special reasons for some discrepancy, connected with the market served by American manufacturers. Basic reasons should be sought if factory managements are to be influenced by such figures.

Analysis of production methods has established two general relationships: one, the horse-power installed indicates the method of production, and two, the number of units of electricity shows the quantity of production. Figures of this kind should be compared between factories to indicate how far modern methods of mechanisation have been adopted. In America attention has been given to units per man-hour as an indication of the use of electricity to speed production. In the U.S. this figure rose from 4½ in 1939 to nearly 7 in 1950, and American electrical engineers plan to raise it to 10 by 1960. The present figure in this country is only 2 units per man-hour.

The means by which electrification can boost productivity are many and varied, and highlights from many of them are reviewed in the address. For instance, there is the application of electric heating in the metal producing industries. Over 90% of all the high-grade brass is melted electrically, and in the steel industry arc furnaces have been particularly useful in recent years for melting and refining the large quantities of scrap that have had to be used. In the United States the arc furnace is beginning to be used for the production of plain carbon steel, and a recent report has claimed that this tendency is sound both financially and from a fuel-saving viewpoint. In the report concerned, the capital outlay for an electric furnace-shop with a capacity of 250,000 tons per year, is estimated to be little more than half of that required for an open-hearth furnace-shop, while net production costs show a margin of 7 dollars per ton in favour of electricity.

Another factor only just beginning to receive adequate attention is materials handling. The term covers a range of equipment produced by specialist firms extending from simple electric pulley blocks to such elaborate overhead conveyor systems as that installed at the Austin Motor Co.'s assembly plant. In this, car bodies, engines and sub-assemblies of some 800 different combinations are selected for automatic delivery to the assembly line according to a controller which receives punched cards compiled on the basis of sales requisitions or forecasts.

The battery electric truck has many advantages to offer for such work, notably cleanliness and silence in operation. Moreover, it has been proved to be less expensive to run than the internal-combustion-engined alternative. All in all, mechanical handling equipment may have an important effect on productivity with little increase in horse-power.

Commercial and Domestic

Similar stories are told in the address for many other applications of electricity in industry, and the story is extended into the commercial and domestic field. It is with a consideration of the home front that Mr Bernard concludes. His theme at the end is safety, combined with a call for electrical engineers to use their authority when necessary to reassure those members of the public who still regard electrical appliances as somewhat dangerous. The joint E.D.A./B.S.I. Advisory Committee on Electrical Appliances and Accessories has worked with success during the last seven years to rid the market of unsafe electrical apparatus. However, since the most perfect appliances may not be proof against careless handling or deliberate misuse, the public should be warned to use them properly, to switch-off when not in use, and not to attempt repairs that they are not qualified to carry out.

One final sector where Mr Bernard considers that the electrical industry has failed to make its weight felt is in house construction. He feels that members of the I.E.E. should lose no opportunity of extolling the convenience of the flat-pin 13 amp fused plug and its associated "universal" socket-outlet, or of pressing for the installation of a more adequate number of socket-outlets in new houses.

Fair Trading Comes of Age

21ST ANNIVERSARY OF ELECTRICAL FAIR TRADING COUNCIL

"PRICE-CUTTING and discount-snatching are among the principal curses of the Electrical Industry," Mr F. W. Purse, then chief engineer of the London and Home Counties Joint Electricity Authority, declared at a dinner of the Electrical Wholesalers' Federation in February 1933. That the same charge is not applicable today is largely due to the voluntary adoption throughout the Industry of the Electrical Fair Trading Policy. The objects of that Policy have always been "the regulation of business between all sections of the Electrical Industry, so as to ensure that the function of each is defined and understood, and that each receives the fair reward of his labour, to the end that equity and fair dealing prevail throughout the Industry, that the public be well served, and the cause of electricity advanced."

The Policy has, in fact, become the corner stone of prosperity for the Industry and next week-end, 30 October, brings the 21st anniversary of the Electrical Fair Trading Council. To many engaged in the industry, however, the inauguration of that Council is somewhat of a mystery. It may surprise some to learn that the Electrical Fair Trading Policy was conceived during the passage through Parliament of the Electricity (Supply) Act 1926, although certain associations, particularly in Scotland, had made tentative moves in that direction some time before. But with the rapid development in the use of electrical energy following the first world war that led to the proposed establishment of the C.E.B., a clause was inserted in the 1926 Act relating to the sale of fittings.

Committee "D"

This gave power to authorised local authorities to sell and install, etc., electric lines, fittings, apparatus and appliances to their consumers or to contractors acting for the authorities' consumers; the prices to be charged to the consumer were not to be less than the recognised retail prices, and, to the contractors, not less than the normal trade prices. This clause also provided for the Electricity Commissioners appointing a statutory committee consisting of representatives of all sides of the Industry, to determine any questions concerning recognised retail or trade prices. Thus, on 3rd May, 1927, "Committee D" was formed which became known as the Fair Trading Committee. It comprised representatives from B.E.A.M.A., E.A.M.A., E.L.F.A., E.L.M.A., E.W.F., I.M.E.A., N.E.C.T.A., and the E.C.A. of S., and regular meetings were held until its work was finally concluded in 1933. During almost the whole of which time the chairman was Mr F. W. Purse.

Mr A. S. Lowe
(Secretary)

In July 1933, Committee D, having completed its labours, reported on an outline of the machinery which it considered would be suitable for the application of the Fair Trading Policy and suggested that a new committee should be constituted to put that Policy into effect for a trial period, pending the setting up of permanent machinery, completing and obtaining agreement on the discount schedules, etc.

Committee D had, of course, no mandate for that purpose. Thus, in October 1933, was born the Fair Trading Council, with the late Mr D. N. Dunlop, one time director of B.E.A.M.A., as its chairman, and Mr Felix Rogers as its secretary. But once again the supply companies remained aloof from membership although they signified their acceptance of the Policy in principle.

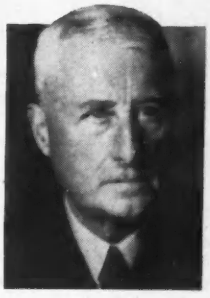
With the death in May 1935 of Mr Dunlop, Mr Walter Finlay became chairman, with Mr Victor Watlington, of B.E.A.M.A., as vice-chairman. The following year, 1936, marked a new era in the Council's work by the formal adoption by the Council of the Policy as "the approved basis for trading in the Electrical Industry," and its agreement to the issue of it for voluntary adoption.

In that Policy, the manufacturer, wholesaler, supplier, electrical contractor and electrical retailer, were probably for the first time authoritatively defined, and the discounts to which they were entitled set out. Certain amplifications were later found to be necessary and in July 1939 a second edition of the Policy was issued.

As we have said, the Policy was originally issued for voluntary adoption, but subsequently there was a suggestion for introducing mandatory features. That idea, however, was finally abandoned in February 1945, when it was decided to relinquish the proposal to seek signed agreements from adherents to the Policy, and to pursue the path of fair trading by conscience. Accordingly, a new constitution was adopted, and late in 1945 a third edition of the Policy circulated. The nationalisation of the electricity supply industry in 1948 has enhanced the relationship between the supply side and the Council, for the B.E.A. has officially recognised the Council as an appropriate body with whom its Area Boards would collaborate in working towards a fair trading policy.

Mr Arthur S. Lowe, who has been secretary of the Electrical Fair Trading Council for the past seven years, tells us that there have been more changes in the Policy since 1945 than at any other period since its initial publication—an indication that the Policy is by no means a static document. Its influence has also spread overseas.

Finally, tribute must also be paid to the unselfish and valuable work willingly given by many prominent men in furthering the Policy, in particular to Mr Victor Watlington, Mr. T. W. Heather (of the G.E.C.), Mr A. E. Iliffe (of Benjamin Electric Ltd.), Mr L. C. Penwill, Mr T. E. Alger and Mr W. H. Walton (of N.E.C.T.A.), who have served on the Council since its formation. Mr Watlington and Mr Heather have been chairman and vice-chairman respectively since 1944. The Electricity Fair Trading Council has now reached healthy maturity—long may it thrive.



Mr V. Watlington
(Chairman)

Rail Electrification Progress at 25 kV 50 c/s

RUNNING DATA ON NEW S.N.C.F. LOCOS

WE have already had occasion to refer to the experimental and test work which French Railways have been carrying out on the use of single-phase 25 kV 50 c/s railway electrification. This is being now applied to the heavily loaded north eastern section of the system particularly on the main line from Lille to Thionville, Metz, Strasbourg and Bâle, which carries the heaviest freight traffic of any line on the French Railways, mostly consisting of complete train loads of iron ore, coal and coke, or limestone.

The economic advantage of a.c. traction lies in the considerable reduction possible in the cost of the fixed equipment, particularly on the high-tension lines, substations and contact lines.

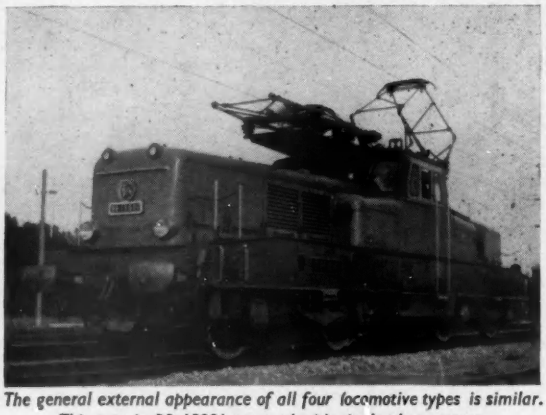
Locomotives

Some details of the locomotives concerned have also been published, particularly in our issue of 13th May when we summarised the papers presented to the I.E.E. on the subject by Messrs M. Garreau and F. Nouvion. Some data on the performance of three of the types of locomotive on order have now become available. The first two put into service were both of the Bo-Bo type and weighed 80 tons each. BB 13001, equipped with single-phase Jeumont traction motors, is the first of 24 now under construction. Between 13th July and 10th September last, this locomotive has covered 19,871 miles, hauling trains with an average weight of 685 metric tons, but with individual loads of as high as 900 tons. BB 12001, equipped with "ignitron" mercury vapour rectifiers and undulating d.c. current traction motors, is the first of 14 being built. This between 17th July and 10th September covered 17,833 miles hauling trains of average weight of 675 tons, but has frequently handled loads of over 1,000 tons. It has even been found possible to start with ease trains of 1,200 tons on a rising gradient.

The third locomotive is of the Co-Co type, CC 14101, and weighs 120 metric tons. It is the first of 102 being built by the Société Alsthom and uses single-phase/three-phase conversion. The average weight of haul is 1,380 tons, but 1,800 ton trains have been handled. Starting tests have demonstated that the capabilities of this locomotive for very heavy goods working exceed anything previously achieved on French Railways. A further series of 20 goods locomotives of a different type, using single-phase/three-phase conversion, but with a frequency converter system are on order from the Société Oerlikon, and deliveries are due at the beginning of next year. Much is hoped from this method.

French Railways are also particularly proud of the performance of one of their new prototype d.c. electric locomotives, BB 9004. Weighing only 80 tons, this engine has hauled a test train of 23 coaches weighing nearly 1,000 tons between Paris and Dijon, a distance of 196 miles, in each direction, with approximately the same timing as the "Mistral" scheduled for an average speed from start to stop of over 77 m.p.h. with a maximum of 87 m.p.h.

Locomotive CC 14101 hauling a mineral train of 1,800 tons. Note the lightness and simplicity of the supporting structures for the catenaries



The general external appearance of all four locomotive types is similar. This one is BB 13001 powered with single-phase motors

The 80 ton Bo-Bo, 1,500 V d.c. loco at Gare de Lyon. This has hauled a 1,000 ton train at an average speed of 77 m.p.h. for 196 miles

From an engineer's notebook

HOW many times, I wonder, have we engineers been treated to masterly surveys of the power resources of the world and how often such studies tail off lamely with a list of odds and ends such as tidal, solar and wind power. In all the surveys I have read, however, one possibility appears to have been overlooked, one which I confess is wholly new to me, that of the osmotic pressure set up when fresh water from our rivers mixes with the sea. It has been estimated that this pressure is equal to about 20 atmospheres, or put another way, it is equivalent to a waterfall some 600 to 700 ft high. Such a prospective power source is clearly worth investigation and initial work is now being carried on under the auspices of the D.S.I.R. The method explored provides for the direct generation of electricity by use of the ionic nature of salt, through the means of membranes incorporating ion exchange resins selectively permeable to the two polarities of ion. In an experimental pile that has been described, forty-seven each of acidic and basic membranes have been employed, each 8 cm sq and spaced 1 mm apart. Through the alternate spaces provided, fresh water and N/2 salt solution pass and the current generated is taken from the compartments at the end of the pile. The maximum e.m.f. obtained with this arrangement is 3·1 V. A serious difficulty arises from the high internal resistance of the pile which is said to be 250 ohms at 10° F. By raising the operating temperature the external power can be increased and at 30° C an output of 15 mW has been obtained. With any startling new prospect such as this, one's imagination tends to take the upper hand and my mind immediately flies to the possibility of supplementing tidal barrages. But to get both feet on the ground again one must face the substantial practical difficulties. First, there is the high internal resistance which provides a problem all by itself before it can be used outside tropical waters. Then again those who have had experience with condensers know what those small passages in the pile can mean and when used with natural waters the possibility of poisoning of the membrane has yet to be determined. On top of this comes the engineering aspect of the physical segregation of substantial quantities of fresh and salt waters of maintaining adequate water flow despite the substantial barrier that is caused by positioning the pile in a river, together with the complication of the reversing tidal flow. None the less the prospect offered is at least as promising as some of the marginal power sources now being investigated and the theoretical energy available must be of a magnitude ranking second only to hydro power.

* * *

IT is only a few years ago that we first heard of the transistor yet what vast strides have been made in that time. Now some half a dozen basic types of crystal triode have been developed and as the problems of uniformity of production are surmounted they will be coming into common use. One of the major difficulties which exist, however, is limitation on the frequencies that can be handled by these diodes and triodes. Some time ago I spoke of confidence in the eventual ability to extend the upper limit of their frequency response and since then further progress has been made. Triodes of the point contact type have been made for use with frequencies approaching 100 Mc/s, but the more robust junction types have considerably lower limits. It is indeed news, therefore, to learn of the development of a junction transistor suitable for use up to 440 Mc/s with possible improvement up to theoretical value of 3,000 Mc/s. This design is of the p-n-p type in which the "p" layers consist of crystaline germanium incorporating some tetravalent impurity such as indium or gallium so as to provide an unfilled interatomic bond, or positive hole as it is termed. The "n" layer similarly includes arsenic within the germanium crystals in this case giving mobile electrons within the layer. In the particular transistor considered the "n" layer is connected as the base, with the "p" layers on either side acting as emitter and collector. The higher frequency response of this design is attributed to a layer of pure germanium between the base and collector junction. This neutral layer acts as a "shock absorber" which reduces the stored energy allowing faster movement of the particles. It has not been made over clear why this should be, but it would seem the positive holes migrate across the negative region or base layer at increasing speeds, thus passing the neutral layer at their maximum velocity into the collector section. One additional advantage resulting from this construction is the possibility of operating at higher voltages and powers. In a transistor of this type that has been made in the Bell laboratories an output of ½ W is said to have been obtained at 100 V.

* * *

TO those of us who do not sail the seven seas, and to whom the wonders of radar navigation have been extolled, it almost comes as something of a surprise to learn of the amount of research devoted to the more ancient forms of navigational methods. Whatever part may be played by p.p.i.'s or beamed radar systems, it still seems the sun continues to hold pride of place as a means of navigation. On those days when the sun fails to make an appearance through cloud formation, however, there is a void in data and to overcome this the U.S. Naval Research department has developed a radio sextant designed to detect radio waves, or should I say, noises, emitted by the sun. It is said that angular co-ordinates of the sun can be determined at any time of the day from this radio noise and what is more, the whole process can be made continuous. The aerial, of dish formation, can be locked on the sun, rather like the later forms of radar ack-ack gun control, and the aerial will automatically follow the sun as it travels through the diurnal arc. The readings necessary for navigational calculations are thus obtained continuously irrespective of climate but whether they are going to add an electronic calculator to take over the whole of the work is left unsaid.

E. R. G.

ROAD TRAFFIC CONTROL

Automatic systems provide flexible control at complex road junctions

By E. THORPE*

Part Two

AS mentioned previously, the majority of junctions can be adequately controlled by a 2, 3, or 4-phase controller, providing a combination of standard traffic phases, overlapped phases, selective clearance periods, pedestrian control, etc. There are, however, situations involving large complicated junctions which require special consideration.

The most notable example of special control applied to a complicated junction is that in use at the junction of Cornhill, Threadneedle St, Lombard St, King William St, Princes St, Queen Victoria St, Poultry and Mansion House St, in the City of London. This junction, traversed by over 35,000 vehicles daily, is generally known as the "Bank Complex" by virtue of its nearness to the Bank of England and the complexity of its traffic movements. Figs. 14 and 15 illustrate the junction layout and phasing of signals and detectors together with the 4 main stages of traffic movement.

Stage 1.—Traffic flows through Queen Victoria St and Threadneedle St with turning traffic to Cornhill and Poultry temporarily held to prevent crossing of the main traffic stream. Cross traffic, from King William St and Princes St is also held for the same reason. Traffic from Poultry and Cornhill is held until the line of vehicles from Queen Victoria St and Threadneedle St has passed.

Stage 2.—Traffic from Poultry and Cornhill now joins in although turning traffic wishing to enter these roads is still held to avoid conflicting streams.

Stage 3.—Traffic now flows from Poultry across to Threadneedle St and Cornhill and from Cornhill to Poultry and Queen Victoria St. Lombard St traffic is also released but temporarily held at the main junction. Traffic from Queen Victoria St and Threadneedle St is now held to avoid crossing the main streams which are flowing.

Stage 4.—All east and west traffic is halted and north and south traffic from King William St and Princes St is allowed to flow, together with west bound traffic from King William St.

In addition to the four main stages there are a number of important minor stages inserted to obtain maximum efficiency and safety.

Minor Movements, Stage 1.—Traffic from Queen Victoria St is given a short lead of approximately three second before traffic from Threadneedle St and Mansion House St eastbound is released, in order to take advantage

*The Author is with the Automatic Telephone and Electric Co., Ltd.

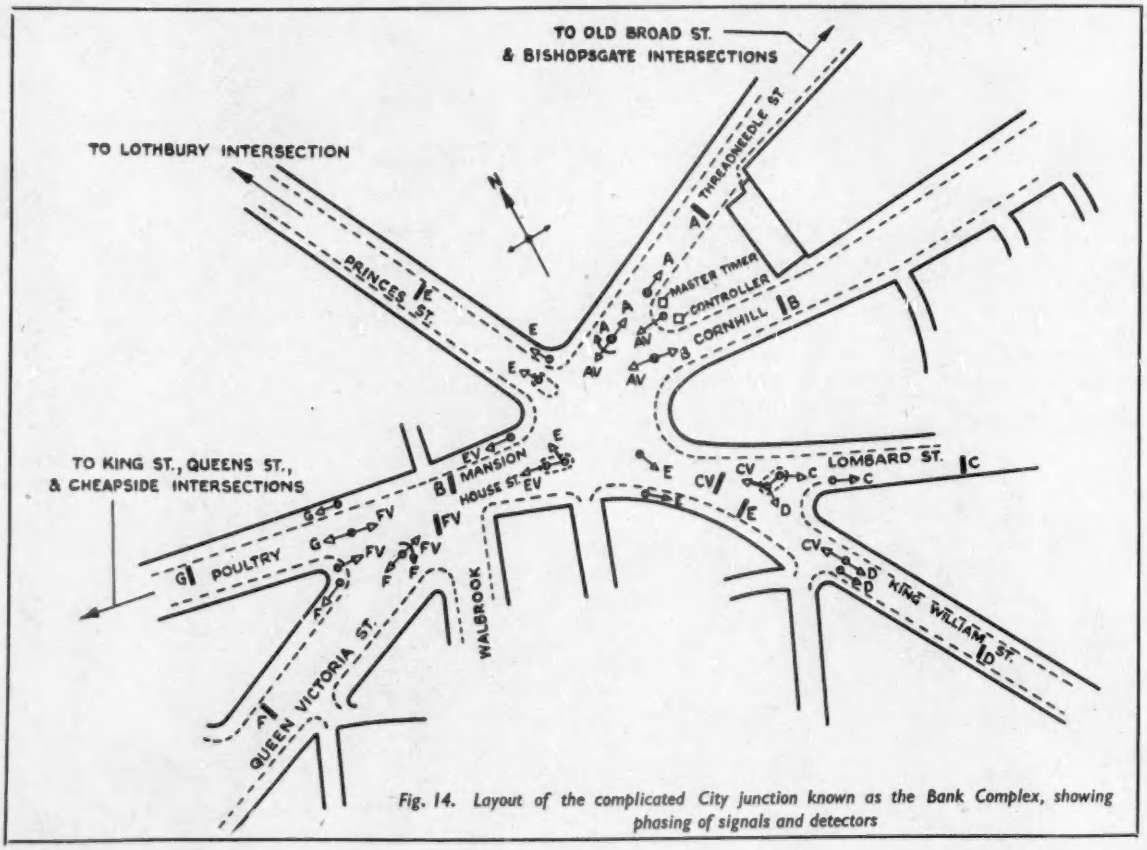


Fig. 14. Layout of the complicated City junction known as the Bank Complex, showing phasing of signals and detectors

of an "all red" clearance period following Stage 4. A green arrow signal permits filtration of eastbound traffic into Threadneedle St and west bound traffic into Queen Victoria St. These filtration signals are continued throughout Stages 1 and 2.

Minor Movements, Stage 4.—At the commencement of this stage an "all red" period is introduced to ensure that all east and west traffic is clear of the junction prior to the release of north and south traffic. A similar period is also introduced at the end of this stage to clear north and south traffic before again releasing east and west traffic. However, an exception is made in favour of traffic from Queen Victoria St, as already mentioned in minor movements, stage 1.

Illustrated in Fig. 16 the control unit for the "Bank Complex" consists essentially of seven individual phase units, one for each approach, together with a common relay group containing a cycle dividing switch in the form of a 50 point uniselector. All units are of the jack-in-type to facilitate maintenance.

The seven-phase units are so arranged that, under idle conditions, red signals are shown in all approaches and green signals are shown in all outlets (AV, BV . . . GV signals as shown in Fig. 14). In accordance with a predetermined plan, Fig. 17, impulses are received from the cycle dividing switch which indicate to each phase unit the commencement and termination time of the green period to which it is entitled. Any particular phase unit can only grant right-of-way during its green period if a vehicle has been detected in the relevant approach, prior to the receipt of the commencing pulse.

In certain cases, a phase not requiring right-of-way may transfer its green period to another selected phase, again providing the latter has a waiting demand. This transfer is termed "passing the option" and ensures maximum usage in terms of traffic flow, of each cycle. It is effective under the conditions listed below:

(1) If no demand exists for traffic in Threadneedle St, Cornhill is permitted to accept the right-of-way period of the former in addition to its own period.

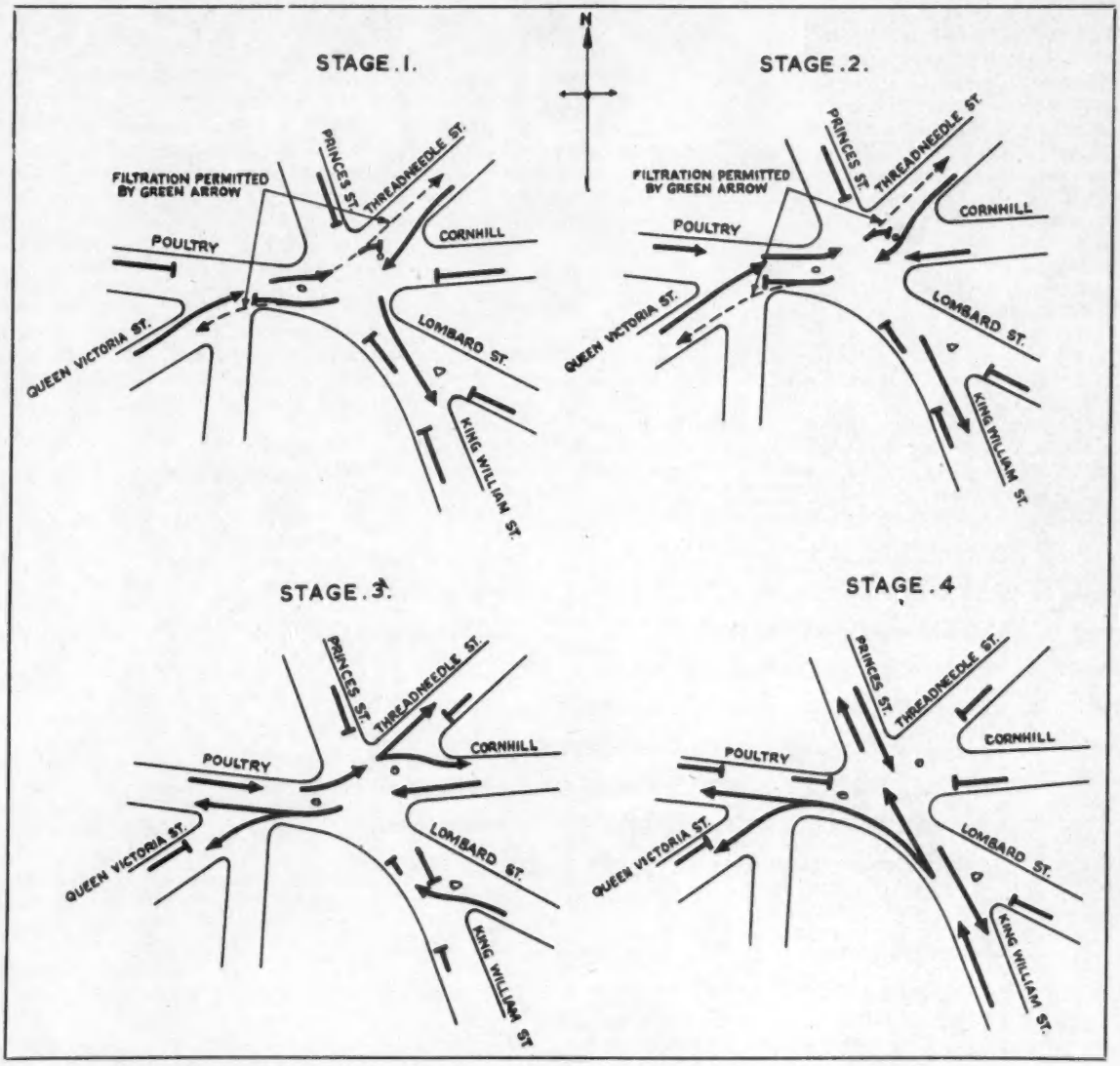


Fig. 15. The four main stages of traffic movement at the Bank Complex with the minor movements also indicated

(2) Traffic in Poultry is permitted to accept the time allocated to Queen Victoria St if no demand exists for the latter.

(3) Traffic in King William St is permitted to accept the time allocated to Lombard St if the latter has no waiting demand.

(4) In the absence of demands for Queen Victoria St, Threadneedle St, Cornhill and Poultry, Princes St if required, is permitted to take right-of-way during this overlap period.

(5) Threadneedle St is permitted to accept the time allotted to Princes St if the latter has no demand and King William St is not running.

It will be appreciated from the above that considerable flexibility of control is provided but that this flexibility is only made possible by the use of vehicle detectors. Thus it can be said that the system is truly vehicle-actuated.

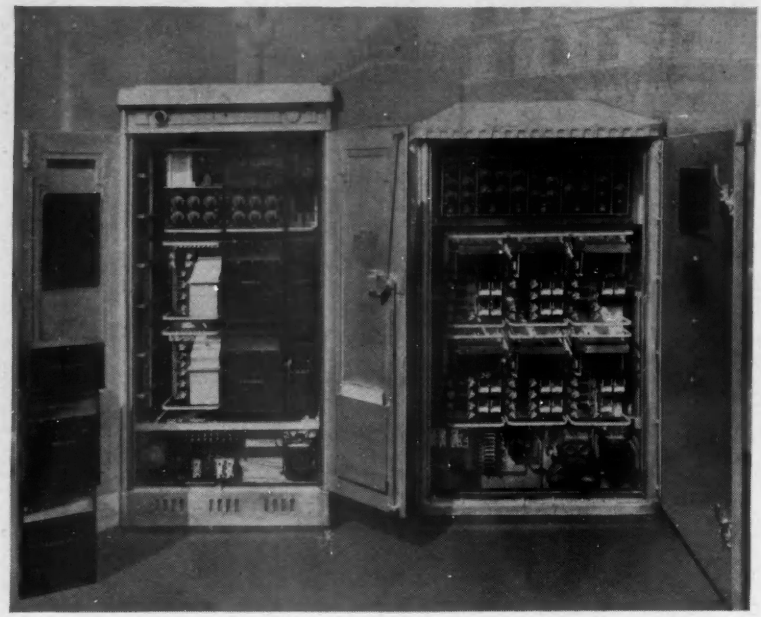


Fig. 16. The controlling unit for the Bank Complex is shown right, and the master timer left

Circuit Details

Considering phase unit A as a typical case, it will be seen from Fig. 14 that two sets of signals are controlled—A signals for traffic approaching in Threadneedle St, and AV signals, for traffic leaving via Cornhill and Threadneedle St. The unit itself consists essentially of a solenoid operated camshaft, a detector relay, a timing CCT, phase interval switches and a number of switching relays. A simplified circuit diagram is shown in Fig. 18, the general operation being as follows.

Assuming the unit to be in an idle position, the camshaft will be resting in position 1 with green AV signals and red A signals being shown via cams CC20 and CC11 respectively, all relays being normal. If now a vehicle crosses detector A, the detector pulse will operate relay AR which locks via its own contact AR1 and CC1 operated, thereby storing the demand for right-of-way. AR2 prepares a charging circuit for QA and AR3 prepares an operate circuit for relay AP. No further action or signal change occurs at this stage.

At the commencement of the plan green period allocated to phase A a positive "operate" pulse is received from the cycle dividing switch via contact 20, ref. Fig. 16, the duration of the pulse being equal to (cycle time)/(steps in cycle) or, in this case 80/50 which equals 1·6 seconds.

Again referring to Fig. 18 the operate pulse operates relay AP for the duration of the pulse. Relay AX now operates via AP3 operated, providing its own locking circuit at AX1 and preparing its release circuit at AX2. Immediately AP operates, a ¼ second quick-charging circuit is completed for capacitor CA from 412V+via cam CC4, AP4 operated, YDZ resistor, and AR2 operated. After ¼ second CA discharges through FA and pulses relay AA which in turn energises solenoid S and steps the camshaft to position 2. Green AV signals are now replaced by amber via CC21 which also provides amber to the A signals in addition to the red which is still maintained via cam CC11.

The unit now times off the amber interval of three seconds, CA on this occasion charging via CC6, amber timing switch and timing resistances. FA flashes after three seconds, pulses relay AA and steps the camshaft to position 3 resulting in a signal change to green A signals via CC9 and red AV signals, via CC22. The unit is now resting in the initial green period which proceeds to time off similarly to the amber period but with the 412V being applied to CA via CC14 and the initial interval switch. At the end of this interval the camshaft is operated as before to position 4. No signal change occurs but the unit

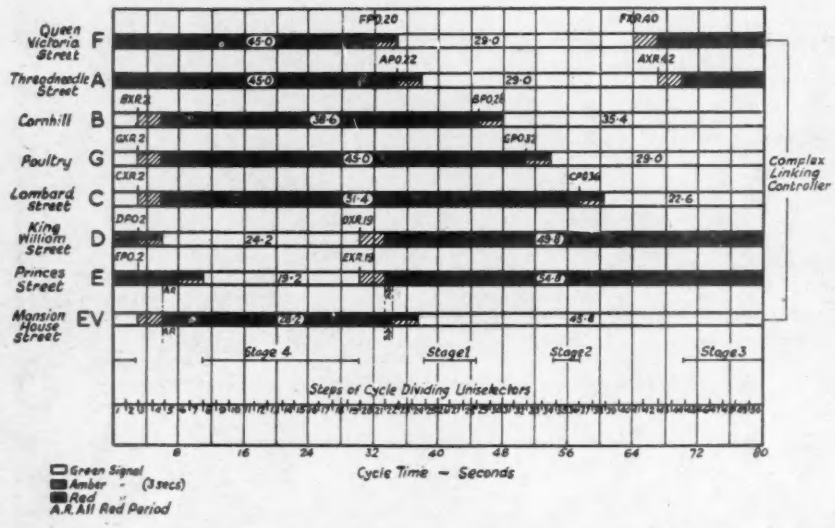


Fig. 17. A typical cycle plan of the Bank Complex

is now resting in the vehicle interval and detector relay AR is released at CC2 but still capable of operating in sympathy with the A detector.

The vehicle interval timing circuit is now complete, CA being charged from 412V via CC18, AX5 operated, and the vehicle timing switch. The duration of green to phase A now depends on the flow of traffic, each detector operation providing a vehicle extension by completing a discharge circuit for CA via the parallel circuit formed by YD resistor, CC15, AX6 operated and AR2 operated.

Assuming that traffic conditions are normal (heavy), right-of-way will be maintained on phase A until indication is received from the cycle dividing switch that the relevant green period has expired. This indication arrives as a positive release pulse via contact 42 (ref. Fig. 17) which effectively shunts out relay AX at AX2 operated, thus causing its release. Relay AX5 normal completes a quick charging circuit for CA via resistor YDF and the vehicle interval is arbitrarily terminated, the resultant operation of AA stepping the camshaft to position 5, amber leaving phase A and red/amber to phase AV. The unit then proceeds to self-time through to position 1 when green AV signals will again be shown until an operate pulse is again received from the banks of the cycle dividing switch during the next cycle.

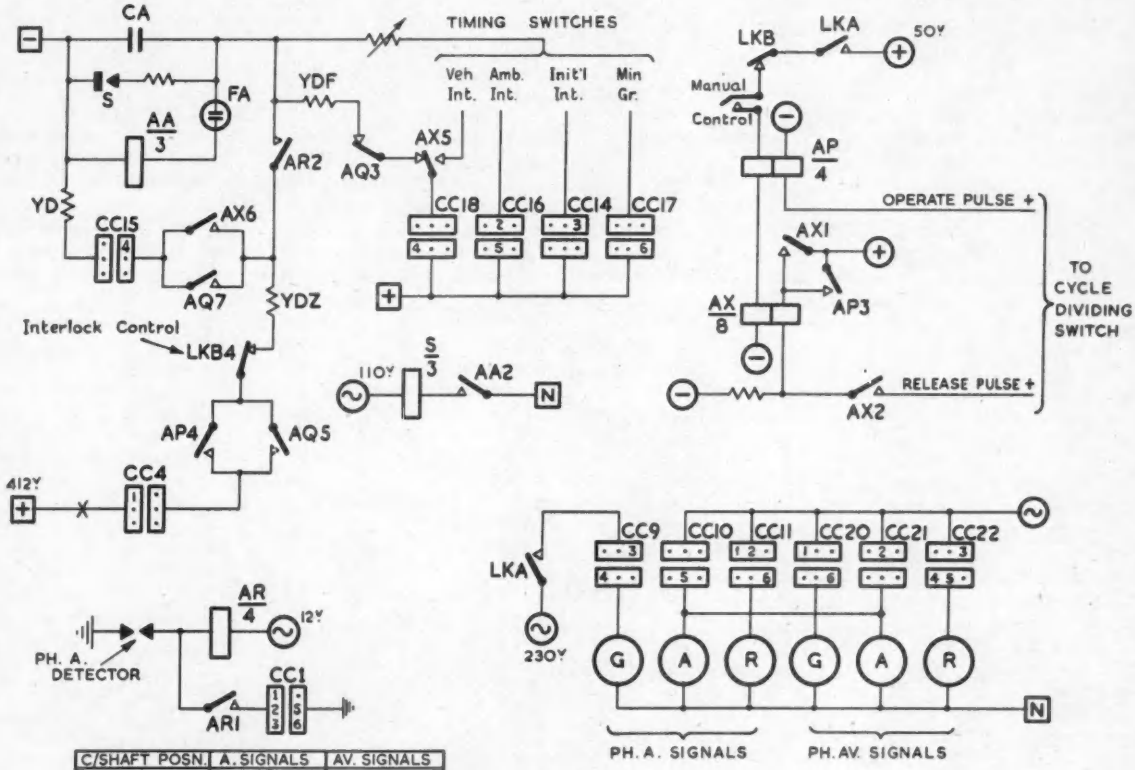
An effective form of interlock is provided to prevent the showing of green signals to conflicting traffic streams, a condition which might occur due to an apparatus fault. Two relays designated LKA and LKB are so switched that LKA is operated whenever green signals are shown to east or west traffic and LKB operated when green signals are shown to north or south traffic.

Break contacts of LKA open the timing circuits of all units associated with the north and south approaches and break contacts of LKB are similarly associated with east and west units. Hence the contact LKB in Fig. 18.

Many other facilities involving comparatively involved circuitry are also provided but a full description of these is rather beyond the scope of this article. It is, however, of interest to note that the controller at this particular intersection is linked to three other adjacent intersections in order to provide comprehensive control of the whole area. The other junctions involved are Threadneedle St and Old Broad St, Threadneedle St and Bishopsgate, and Princes St and Lothbury.

All four junctions are linked via a master timer unit (left-hand unit in Fig. 16) the primary functions of which are to provide indication of the cycle time in use and a source of pulses to drive the associated cycle dividing switches in each controller. This ensures correct movements at all junctions in relation to the cycle time. Three plans or cycle timings are provided and are selective automatically by time switch or manually by keys. These basic plans ensure that the high efficiency of the signals is maintained under widely different conditions of traffic flow.

The foregoing is by no means a complete description of all the capabilities of "Electro-matic" vehicle-actuated control but it is hoped that the reader has at least gathered some of the finer points of the system which has developed into a science of ever-increasing importance.



C/SHAFT POSN.	A. SIGNALS	AV. SIGNALS
1	RED	GREEN
2	RED/AMBER	AMBER
3	INITIAL	RED
4	VEHICLE	RED
5	AMBER	RED/AMBER
6	RED	GREEN

Nos in cam contacts indicate "make" positions.

Fig. 18. Simplified circuit for phase unit A (Threadneedle Street) in the Bank Complex

Grain Drying in Practice

THE East Midlands Electricity Board have connected to their mains this year 226 additional electrically operated grain drying plants and last week the opportunity was taken to visit (as part of a tour organised by the Board for interested farmers) typical installations situated in the Market Harborough area. Since, in many cases, harvesting was still in process the plants inspected were generally in operation. When considering the installation of grain drying plants, the staff of the Board undertake to recommend a particular type of installation since each has to be individually designed to suit the farm. Moreover they design, prepare specifications and generally supervise the whole installation including the civil engineering work. Such was the case in the farms visited. In some cases completely new buildings have to be built to house the silos, dressers, conveyors and electrical equipment necessary for grain drying although in other cases existing buildings may be converted or modified.

Perhaps the most interesting of the installations inspected was a dual-purpose plant for dealing with both grass and grain harvests. In this case, a large building had been divided down the centre by an eight foot wall, at the back of which was an air duct with three equally-spaced openings to the drying floor. Each of these openings was fitted with a door to give individual control. When dealing with grain, about 300 sacks (15 tons) are arranged in a long narrow stack in which a tunnel is left so that air from one of the ducts may be blown along its length. According to the moisture content the blowing period may vary between 24 and 40 hours. Three ducts are provided so that whilst one stack is being built, the second may be in operation for drying, and the third dismantled. Results have been satisfactory and actual performance figures registered on a sample of grain, showed a reduction of moisture content by 6% to 14%. This was achieved in 40 hours. The farmer expressed his approval of the installation stating that it had proved most economical to run and easy to work.

At the conclusion of the harvests the whole of the concrete drying floor will be used for either housing young stock or farm machinery during the winter so that no space is wasted. During the summer the same floor is used for drying grass, instead of leaving it in the fields for normal haymaking. For this purpose, three tapering ducts of chestnut paling are laid across the floor at right angles to the air duct. Wilted grass is then evenly spread over the drying bay and the fan operated. The installation described above cost £678 of which electrical equipment accounted for £460 and the cost of installation £120. Two motors, each driving a 19 in. 3 h.p. fan giving an output of 7,250 cu ft/min, operate with a 27 kW heater. Both motors are used for grain, one only when drying grass.

The Supervisory Aspect of Consulting

THE advisory part of a Consulting Engineer's activities is usually supplemented by supervisory work, as the client in deciding to give effect to the consultant's report and recommendations often asks the Consultant to supervise the carrying out of the work. What such supervisory work entails in practice was indicated in broad outline by Bryan Donkin, B.A., M.I.E.E., in his Presidential Address to the Association of Supervising Engineers, which, presented in the I.E.E. Lecture Theatre last Tuesday, gave accounts of the day to day supervision of heat-electric systems.

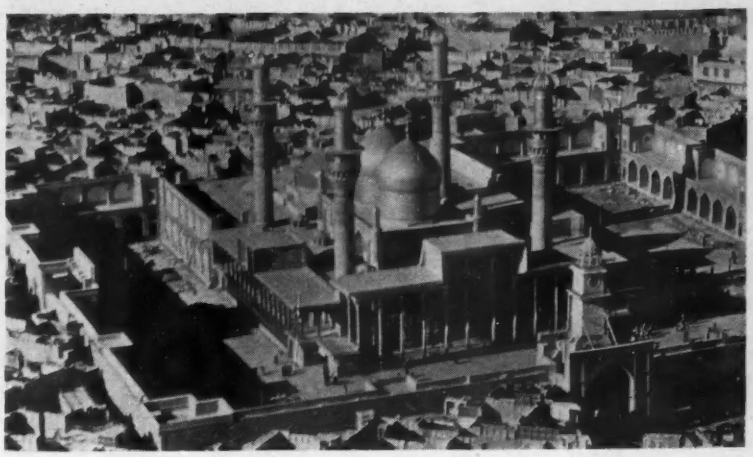
Broadly, the Supervising Engineer's objectives are to see that the job (when the general outlines of a project are decided) is done properly, is done promptly and is done economically, with a small degree of priority in that order. On site, the duties of the Supervising Engineer usually start right at the beginning of the work when he will be called upon to investigate the amount of land or space available for accommodating equipment, or the ground condition to determine any special foundation arrangements which may be necessary. After this preliminary work, the engineer is not then concerned with detail until construction is about to start when he is required to programme the work, involving a check of delivery times and periods required for construction.

Actual construction involves initial civil engineering work, requiring the attendance of the Supervising Engineer to ensure that foundations are the correct depth, that reinforced concreting is carried out properly. These activities require the Engineer to be in constant attendance. The next stage involves informing manufacturers that delivery of equipment may be taken. Delays in delivery can be minimised if the Supervising Engineer has made a careful check of manufacturing progress, with regular inspection visits to the works. As construction work proceeds, the Engineer will also be responsible for integrating the work of separate contractors, acting as "umpire" if necessary to avoid cross-interference. Although as much as possible of the equipment will have been tested at its origin, the Supervising Engineer is also responsible for inspection and testing of final assemblies, especially if the components have come from different works, and for ensuring that contractors rectify any outstanding defects.

Another facet of these supervising activities is the control of operations, a particular example being the operation of a thermal storage electric generating station comprising two back-pressure and two condensing turbines at a linoleum factory, where somewhat unusual design offers a number of control possibilities. As the station may be operated independently of the Grid System, the advantage of parallel operation in balancing the steam and electricity outputs is not always available. Apart from attending to balancing, the controls must maintain correct pressure and temperature in the l.p. works steam supply. As this is used entirely for heating, the control has, therefore, to ensure that the steam arrives in a dry saturated condition.

Both pressure governing and pendulum governing are employed, the latter coming into use when the station is running independently of the Grid. When in use, the pendulum governor is primarily a speed controller, creating conditions in which the electrical load decides the amount of back-pressure steam available. If more steam is required, it can only be obtained by drawing from the h.p. main, whilst if a surplus exists, the excess steam can be absorbed in the hot water accumulator. If, however, the electrical demand rises, it can be met by bringing the condensing sets into operation. A further method of maintaining balance, for small load variations, is variation of the back-pressure, a facility made available by the use of the l.p. steam for heating only, whilst ripple control enables non-essential electrical or steam loads to be jettisoned.

British Enterprise in the Middle East



—THE BAGHDAD FAIR, 1954

IN the historical annals of British overseas trade certain events are outstanding for the manner in which they influenced and furthered the country's business in succeeding years. When the story of the present comes to be related one such event which must surely find its place in the narrative is the Baghdad Trade Fair of 1954. This all-British exhibition set in the heart of a rapidly developing corner of the globe is an excellent example of enterprise which will surely have its effect in improving British prestige and trade in the Middle East. Hitherto U.K. manufacturers have shown their products in the world's markets either individually or as a national body, but the Baghdad Fair is the first overseas exhibition devoted exclusively to our own products. It will not be the last.

The organisation of the Fair is timely. It is being held whilst Iraq herself as well as her neighbouring States are embarking on extensive development projects, and it needed little prompting from official sources for British industry to seize the opportunity of placing their names and wares prominently before good prospective customers with money to spend. Over 400 exhibitors are represented on the 700,000 sq ft site and a considerable proportion of those exhibitors are well-known names in the electrical industry.

Need for Power

Electrical firms, probably more than any others, have much to gain, for all the numerous plans for development in the Middle East depend initially on the availability of electrical energy and electrically-powered machinery. Primarily, therefore, the demand will be for capital plant. In Iraq the main market seems to lie with equipment for generation, distribution and transmission. The Lebanon has plans for exploiting her hydro-electric potential, and so has Syria, whilst steam stations are also envisaged. Looking West to Turkey and Egypt, and East beyond Iran to Pakistan and India, demand for electrical plant is just as great. Another State doing a great deal of business at present with the U.K. is Kuwait. Electrical manufacturers are probably aware of the vast potential market which exists in this rich locality occupying a small corner in the Persian Gulf. The original 60 consumers of 1934 have grown in number to over 8,000, and to meet their resultant increase in demand a 30 MW steam station is being built and is to be extended by a further 40 MW. Demand is almost unlimited and ranges from generating plant, substation equipment and cables to domestic appliances, lighting fittings and small accessories for a variety of constructional work. Visitors from all these countries are converging on Baghdad and receive a great welcome from British manufacturers.

Some Exhibitors

Those visitors interested in power generation are well catered for by such companies as English Electric, Crompton Parkinson, Metropolitan-Vickers Electrical, the General Electric and British Thomson-Houston, all of whom offer a range of alternators, switchgear, control gear and other plant, truly representative of that field. Boiler plant and pressure vessels are shown by Babcock and Wilcox, who also cater well for the oil industry both on land and sea. Transmission of power is emphasised by British Insulated Callenders Cables, Siemens and W. T. Henleys, with their comprehensive range of cables and wire among exhibits, and there will be no shortage of orders in this field judging from the proposed extension of distribution lines in most countries thereabouts. Groups of companies with ranges of equipment too various to enumerate here, but we trust not too comprehensive for our Middle Eastern friends, are the Brush Group, the Heenan and Froude Group and the Owen Organisation.

The impression should not be gained, however, that the exhibits of these firms already mentioned are confined to the specific class of goods. In almost every case the company concerned is well aware of the potential market in every sphere of their activities and have taken steps to give as complete a picture as possible of the goods they have to sell. The majority make and are showing smaller accessories, small motors, switches and similar articles, and to the names already noted should be added J. A. Crabtree and Hoover. Prominent in other spheres of activity are Stewarts and Lloyds and I.C.I.

With added supplies of electricity the demand for domestic appliances will certainly increase, and here, too,

The Golden Mosque of Khadamain stands out well in the aerial photograph of Baghdad at the top of this page, which is reproduced by courtesy of the Iraq Petroleum Co.

there will be no lack of orders. Familiar names appear again with impressive displays of cookers, refrigerators, lamps, lighting fittings and so on. Not mentioned so far are Edison Swan, B.V.C., Jackson Electric Stoves and Thorn Electrical.

Already the reader will have gathered that electrical manufacturers have scarcely ignored the Fair. The Middle East is having an impressive sight of our industry. Other names appear no less distinctively in the official catalogue. Automatic Coil Winder, Ottermill Switchgear, Pinchin and Johnson, Standard Telephones, are among those exhibiting on their own account. There are, too, innumerable companies represented by agents. In this latter category are to be found E. K. Cole, Evershed and Vignoles, Key Engineering, R. A. Lister, M.E.M., Ransome and Marles, Scottish Cables, Wandleside, and a host of others.

It is a fact also that representatives of British companies are on the spot and doing business even though their names do not appear in the list of exhibitors. Hotel rooms and suites have been booked by non-exhibitors, and they are operating outside the exhibition ground proper.

Another notable feature of the Fair is the electronics section. Not only is it the first sales effort of our domestic radio industry in the locality, but it is also the biggest display yet staged by manufacturers outside this country.

The exhibition has been organised by British Overseas Fairs Ltd. on behalf of the F.B.I., and they have left no stone unturned to make the event a success. It has, of course, the full support of the British Government and the enthusiastic co-operation of the Iraqi Government. The Fair was officially opened last Monday by H.M. King Feisal and a measure of the Iraqi keenness may be gained from the fact that a special postage stamp has been issued to commemorate the event, and all letters in and out of Baghdad are being specially franked. The Fair will close on 8th November, by which time it can confidently be expected that many firm orders will have been obtained and valuable contracts signed. More important will be the long-term effect of the exhibition; seeds laid for trade in future years; and the boost given to British prestige, economically and politically. Britain has undoubtedly stolen a march on her industrial competitors and it remains to be seen to what extent the advantage gained by the Baghdad Trade Fair can be exploited.

New Laboratories for E.R.A.

AT the beginning of this year work commenced on new research laboratories which are being built under direction of the Electrical Research Association, on a site in Leatherhead. The scheme, which will cost about £400,000 provides for three buildings, the main block housing a total of 15 laboratories in addition to a conference room, library and office accommodation, a high voltage laboratory and a workshop.

In this building research will be carried out on a wide variety of subjects. To cater for experiments needing more headroom than normal, the first floor has been made double height. However, this does not apply to all the floor, since a third of the total area is divided into two normal floors to give a platform for observing experiments and to provide additional working space. The building will have four floors altogether. Supplies are obtained from a generator room which contains the main battery and gives flexible a.c. and d.c. output. It also supplies the power for research on cables and heavy conductors which is carried out in one of the laboratories set aside for this purpose. This room has a cable trench for investigations on long conductors in stable thermal environments, floor ducts to facilitate interconnections and ready access to open paved space suitable for tests is provided.

Three laboratories have been set aside for that important study—properties of materials, with particular emphasis on insulation. A.C. and d.c. supplies up to 100 kV and up to 25 kV at higher frequencies are available for this purpose while for more general insulation problems involving electrochemical effects, a physics laboratory has been provided. Provision is made for ancillary laboratory work concerned with other E.R.A. activities, such as wind power.

Housed in a separate building the high-voltage laboratory will be equipped with a 3 million V surge generator for impulse testing and a million V transformer for work on power frequency. Other equipment will include a high-current surge generator and high-voltage d.c. equipment, so covering test voltages corresponding to the highest supply voltages. The testing bay has an area of 5,000 sq ft and since the height is 50 ft, it can accommodate the largest size of transformers. Since the effectiveness of a research laboratory is dependent upon its workshop, those to be provided will be suitable for all work from precision instruments to the fabrication of switchgear and transformer components.

Opportunity is being taken to install electric heating in each of the three buildings. Thermal storage is to be employed so that the heating will represent an off-peak load and in fact will approximate to that taken during the day, so giving a high load-factor. In the main block, thermostatically-controlled immersion heaters will supply conventional radiators through a low pressure 2 pipe system. The workshop and H.V. test room will each have floor heating systems. Wherever possible thermocouples and heat meters are to be installed to enable comparison of the systems to be made. Electrical intake from the S.E.E.B. will be metered at 11 kV. Two E.R.A. owned oil-immersed fused switches will each control a 500 kVA transformer. Power to the three buildings will be transmitted by underground cable. Normal distribution is at 415/240 V.

Model of the main building shown here houses administrative and office blocks in addition to the main laboratories

POWER SUPPLY Statistics

SEPTEMBER

AN impressive total of plant commissioning was recorded by the B.E.A. for September, the increase of 150 MW in installed capacity being the second highest this year. The Authority's installed capacity now stands at 19,225 MW, and should the remaining months of the year see the same rush to commission plant this figure should top 20,000 MW by 31st December. The B.E.A. is, however, not alone in its plant commissioning, for the North of Scotland Hydro-Electric Board have augmented their installed capacity by a further 10 MW, bringing the total to 590 MW.

Three sets are included in the B.E.A.'s new plant. There are two 60 MW units, one of which is recorded for Chadderton Generating Station (North West, Merseyside and North Wales Division). A Metropolitan-Vickers machine, it is the second set for this station, and was commissioned together with a further 360 klb/hr boiler. This, like the other two recorded so far, is manufactured by Simon-Carves. The other 60 MW turbo-alternator was commissioned at Uskmouth Station (South Wales Division) to bring the total here to four, all by G.E.C. This commissioning was also accompanied by that of a boiler, the station's eighth 360 klb/hr Babcock and Wilcox unit. To round off the last of the turbo-alternators comes a 30 MW unit for East Yelland Station (South Western Division). This is a Parsons set, making three commissioned in all.

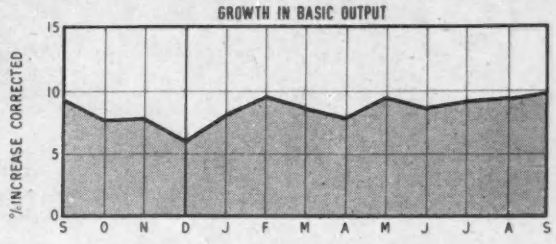
Of the two remaining boilers commissioned (both in the London Division), the larger is a 320 klb/hr Clarke, Chapman unit, recorded at Brunswick Wharf Station, where nine boilers are now steaming. The other boiler is at Acton Lane B. Of 240 klb/hr rating, it is by Mitchell and is the second to be commissioned here.

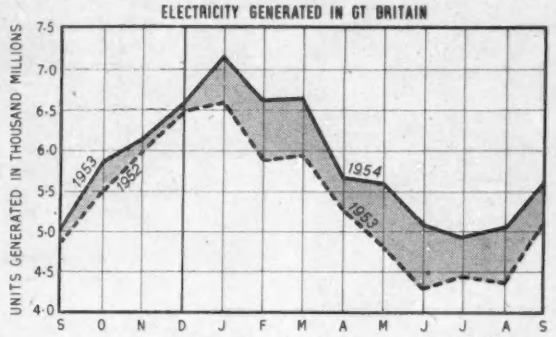
Sales of Energy

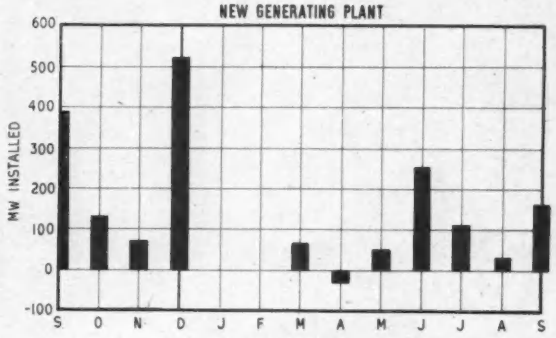
During the last three or four months it has been usual to observe all-round sales increases over the previous year, and figures for September portray the same, in fact, an even better picture. In only two cases has the rise in sales over the corresponding month last year been less than 10%, and even then, the figures of 9·3% and 8·7% (for the North Eastern and North Western Boards respectively) are by no means unimpressive. As in previous months also, the South Western Board has led the field, with an increase of 21·5%, whilst direct sales by the Central Authority are as much as 37% higher than September last year. This rise can, of course, be partly attributed to the operation of the Manchester-Sheffield railway. Nationally, sales of energy were 12% up on the same month last year, and even when allowance is made for temperature, the effective basic load increase of 9·8% is the highest monthly rise to be recorded for several years.

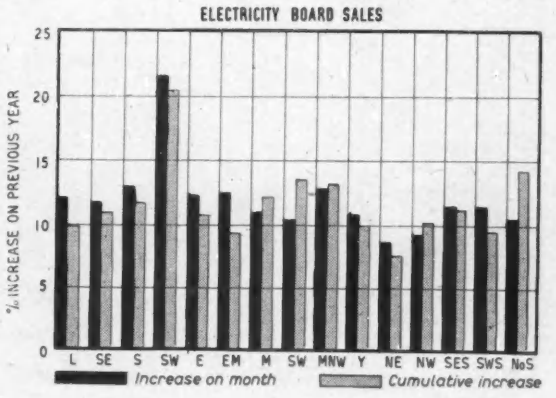
B.E.A. Sales to Area Boards in September

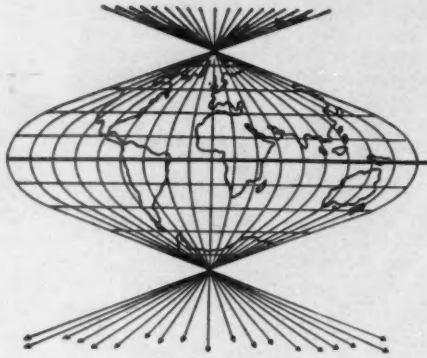
Board	September sales in million units	% increase on September 1953
London	424·5	11·9
South Eastern	265·7	11·6
Southern	224·3	13·0
South Western	173·5	21·5
Eastern	445·8	12·2
East Midlands	395·6	12·4
Midlands	526·4	10·9
South Wales	326·0	10·4
Merseyside and North Wales ...	310·0	12·8
Yorkshire	523·7	10·8
North Eastern	316·2	8·7
North Western	574·5	9·3
South East Scotland	109·3	11·4
South West Scotland	260·8	11·4
Direct Sales by B.E.A.	109·9	37·0
Grand Total	5,086·2	12·0











OVERSEAS NEWS

A SUMMARY OF IMPORTANT EVENTS

CANADA

Development Proposal

In its prospectus covering the issue of $15 millions of 4½% Cumulative Redeemable Preference stock, the British Columbia Electric Co. list some of the major items included in next year's programme. These include $5·3 millions for the Cheakamas hydro-electric development in which the plans provide for the installation of two generators totalling 190,000 h.p. Subject to the receipt of the necessary water licences, it is hoped to have the first set in operation in 1957 and the second in 1958. A further sum of $3·9 millions is scheduled for expenditure on electric line and service extensions on the Lower Mainland and Greater Victoria.

Storm Damage

Winnipeg City Hydro electricity undertaking is faced with a total bill of about $95,000 as the result of damage incurred by a storm last June. Of that sum, $47,537 is in respect of transmission lines to the Pointe du Bois power plant on the Winnipeg River, $30,049 for distribution lines inside the city, $3,816 for roof damage, etc. at the power plants, and $13,420 incurred in the operation of stand-by steam plants. Winnipeg's problem is that such costs have to be paid out of the undertaking's operating account. Mr. H. L. Briggs, general manager, has said that the City Hydro needs an emergency fund to cover such losses, as was the practice of certain other Canadian utilities. He is to take up the matter with the finance commissioner.

Schemes for Prince George

Proposals to solve the power problem of the city of Prince George, British Columbia, were discussed at a recent meeting of the Board of Trade there. It was stated that an investigation of the Clearwater river as a source of power for Central B.C. was being undertaken by the B.C. Power Commission, while reports from the area being flooded by the Kenney Dam on the upper Nechako river showed that the reservoir was filling up much faster than estimated by Alcan engineers and there might be a surplus of water for a power development at the eastern end of the artificial lake. Eastern interests who wanted to supply the city with power from a canyon site on the Willow river, less than 20 miles from Prince George, had not submitted any concrete proposal. A memorandum prepared by W. E. Bowness, Calgary consulting engineer representing the eastern power interests, estimated that the Willow river site, with storage on Stone lake would provide about 15,000 h.p., and with the present diesel plant only for emergency use during extreme winter low water, would give about 20,000 h.p. With an increase in the load, several hydro-electric sites in the area or the Bowron River coal, or gas would be considered. If, however, a major industry requires power, a larger hydro-electric site requiring longer transmission would then be feasible.

EUROPE

Yugoslav Order

The Belgrade firm, Elektrosabija, is to construct a hydro-electric power plant at Souk Wadi Barada, in Syria, for the Damascus Department of Electricity and Trams, it is reported. The Yugoslav firm obtained the order in competition with ten other firms. We understand that this is the third Yugoslav firm carrying out capital work in Syria. The other two are the Maritime Construction firm of Split which is building the Port of Lataki and the Trudbenik of Belgrade which is engaged in soil improvement work in the El Gab desert.

Heat and Power for Warsaw

The boiler of the first heat generating section of the Zeran power and heat generating station in Warsaw was recently put into commission. Very shortly the station will start supplying electric power and hot water to Warsaw houses and offices, and steam for industrial purposes to factories in Warsaw. We also have news from Poland that the third set of turbines at the Jawozna II power plant, in Cracow Voivodship, has been undergoing trials.

S.W. ASIA

Scheme for Pakistan

Utilisation of the water resources of the River Kunhar, in the production of electric power for the North-West Frontier Province and the Punjab, is proposed in the Kagan Valley multi-purpose development project recently submitted to the Pakistan Government. In this, the establishment of three power stations is visualised. Total cost of the project is estimated at Rs. 144,958,000. One advantage of the scheme is that work could be started without any hindrance from any foreign quarter as the Kunhar River is entirely within the North West Frontier province. The first power station in the plan is the Saiful-Maluk, at the foot of the legendary lake of that name. That station would be capable of generating 284 million units annually. A further 9½ miles down the river would be the Kamal Ban hydro-electric station, with five 42,000 kW Pelton turbines, which would generate about 1,361 million units annually. The third station would be near Garhi Habibullah, a further 21 miles down the river, where four 27,000 kW Pelton turbines would be installed. It is suggested that the total capacity of the stations could be increased to about 500 MW—sufficient to meet the needs of the two northern provinces for another 20 years. A further proposal in the plan suggests an electric railway service in the Kagan Valley which would connect all the tourist spots.

Work on Karnafuli

Construction work on the main 2,000 ft dam of the Karnafuli project, Pakistan, is expected to begin this year. When complete it will create a reservoir having a surface of 25 square miles. The project will supply electricity to 40% of East Pakistan's total population covering an area of about 15,000 square miles.

Plant Manufacture

The Government of India have appointed a Committee to enquire into the manufacture of heavy electrical equipment in the country. The Committee is expected to report to the Government by the end of next month. It is to enquire into the exact requirements of the country in the matter of heavy electrical equipment and the extent to which these requirements can be met by current production in India and by its possible expansion in the immediate

future. The Committee will take into account the unused capacity available in Government establishments and workshops including those of the State Government's. It will investigate the extent of the remaining requirements and how this could be met speedily and economically and the agency through which it should be met. The Committee will consult producers and engineers, visit factories, establishments and workshops in the course of its enquiry. For some time now India has been considering the establishment of its own heavy electrical industry, with outside assistance.

SINGAPORE

Traction Take Over

The Singapore Traction Company has received information from Singapore stating that the president of the city council has announced the rejection by the Government of the take over recommendations. The Government suggested that the city council should in due course set up a Central Transport Authority. If this independent transport authority is set up by the Government to acquire the company it is unlikely that there would be a compulsory take over before 1962.

AUSTRALIA

Good News for Brisbane

The first set at the Tennyson power station of Brisbane City Council is expected to be operating early next year. Several months later the second 30 MW unit will be commissioned to complete the first stage of the project. Present plans provide for a duplication of the first stage by the installation of two more 30 MW turbo-alternators.

Snowy Hopes

The first power from the Snowy Mountains hydro-electric scheme was expected to be available in December or January next, the Minister for National Development, Senator Spooner, has stated. He said light snow falls in the southern Alps and the recent sudden thaw had enabled the Snowy Authority and its contractors to start their summer programme quicker than usual. The construction of 19 miles of aqueducts for the Guthega project was now being resumed. They would collect water from the heads of the streams which would otherwise enter the Snowy River below the Guthega dam and carry it upstream to the reservoir. Preliminary work had been started by the contractors for driving the 13·8 miles tunnel from the Eucumbene River in the Snowy catchment to the western side of the great dividing range.

Atomic Power

Because of their lack of coal and natural power, South and Western Australia were likely to be the first states to use atomic power for electricity generation in Australia, Mr Menzies, the Prime Minister has stated. He said the Government would rely on its experts, including the Australian Atomic Energy Commission, of which Professor Baxter, an eminent nuclear scientist, was a member, on how and when they would move into the atomic power production field. If and when atomic power became a practical proposition there need be no fear that they had denuded themselves of uranium resources for that purpose. The whole question of atomic power in the long run was a problem of economics. The important thing was that they had their own supply of uranium and their own scientists to develop this field. They also had a good exchange of scientists with the United Kingdom.

NEW ZEALAND

Inter-Island Power?

"The crazy things of today become the commonplace thing of tomorrow. Particularly was this so with the march of science," declared Mr C. J. Lovegrove, president of the N.Z. Electrical Supply Authorities Association. He was commenting on the objections raised by the Prime Minister, Mr Holland, against the proposal to transmit power from the South Island, across Cook Strait, to the North Island, which we reported last week. Mr Lovegrove, who has urged in the past an investigation of the proposal, believes that some day there will be integration of power between the South and North Islands. Many eminent engineers including engineers in New Zealand, were favourably impressed with the practicability of transmitting power across Cook Strait, he added. Mr Lovegrove emphasised that the immediate concern of members of his association was not integration of power between the two islands but the availability of power to both.

Wiring Regulations

The lengthy delay in presenting a draft revision to the 1935 edition of the New Zealand Wiring Regulations, for discussion by electrical contractors, was the subject of much comment at the recent meeting of the N.Z. Electrical Federation. The contractors regretted the inability of the State Hydro-Electric Department to present the draft. The Federation considers that the wiring regulations should be framed in a practical way, and be administered by an authoritative body such as the Electrical Wiring Regulations and Safety Council. It is also suggested that the State Hydro-Electric Department could usefully study the British I.E.E. Wiring Regulations and adopt them.

Waikato Development

The New Zealand Ministry of Works has announced that 44 more miles of the Waikato River will be harnessed by the Ohakuri and Waipapa hydro-electric schemes, for which the river is to be diverted immediately. The projects are expected to take at least six years, cost over £12 millions and produce about 133,500 kW. According to the Ministry's announcement Ohakuri will have a capacity of 84,000 kW and Waipapa 49,500 kW. The former will be built about five miles upstream from Atiamuri. It will be in a gorge, with an arch dam rising more than 100 feet above the present river level, and with a diversion tunnel. The lake behind the dam will extend 38 miles upstream. Waipapa will be sited below Maraetai and at the head of Arapuni Lake.

For the Aura power station, in Norway, the Metropolitan-Vickers Electrical Co., Ltd., has received orders for four 37,500 kVA and two 65,500 kVA horizontal waterwheel generators. Three of the smaller machines are already in operation. Dr F. Vogt, managing director, Norwegian Waterways and Electricity Administration, recently visited Metropolitan-Vickers' Trafford Park Works, where he inspected some of the machines under construction. Our picture alongside shows Dr Vogt, left, and Mr J. S. Wright, superintendent M.V. Plant Department, with the stator yoke of one of the larger sized generators. The Aura power station, built entirely underground, is to be the largest hydro-electric station in Norway. Much of the power produced is intended for the nearby Sunndalsöra aluminium plant which, when in full production next year, will increase Norway's aluminium output from about 55,000 tons to approximately 100,000 tons a year

Personalities IN THE INDUSTRY

Just appointed deputy divisional electrical engineer to the North West, Merseyside and North Wales Division of the B.E.A. is **Mr J. A. Spence,** B.SC., M.I.E.E., A.M.I.MECH.E., who was formerly transmission engineer with the Merseyside and North Wales Division. Educated at St Andrew's University, he served his apprenticeship as fitter with J. F. Low and Co., Scotland, and later became junior engineer with the Dundee Corporation Electricity Department. He also served a college apprenticeship with Metropolitan-Vickers Electrical Co., Ltd. From 1933 to 1939 he was with the Central Electricity Board in the East Lancs. section of the N.W.E. Area as first assistant section engineer. For the next four years he was assistant transmission engineer to the Metropolitan Electric Supply Co., and in 1944 he obtained a position with Kennedy and Donkin, consulting engineers, as resident engineer for Northern Ireland, serving there until 1948.

Edmundsons Electric Co., Ltd., announce that **Mr A. H. Young,** M.I.E.E., has been appointed deputy chairman of the company, with effect from 18 Oct, and Messrs **G. H. Bowles, A. G. Lindars** and **E. H. Maltby** have been appointed directors of the company as from the same date.

Mr A. Richardson, B.SC., has been appointed as lecturer in the Department of Electrical Engineering at Leeds University.

Mr H. G. Baylis has been appointed sales manager of the Birmingham branch of Electrical Components Ltd.

Mr Allan H. Edney, D.A.A., M.I.A.M.A., group publicity manager of Parnall (Yate) Ltd., has been appointed Hon. Treasurer of the Society of Diploma Members of the Advertising Association. He has been a member of the Society's Executive Committee since 1952. Incidentally, Mr Edney is also a Council Member of the Publicity Club of London which claims to be the largest club of its kind in the world.

Station superintendent at the Luton power station, Eastern Division, B.E.A., since 1926, **Mr G. Dorrington,** M.INST.F., is to retire at the end of November, after 49 years service in the industry, the whole of which has been spent at Luton. His successor there will be **Mr H. Jagger,** A.M.I.E.E., M.INST.F., who has been deputy station superintendent at the Division's Letchworth power station for the past ten years. Educated at Bradford Technical College, Mr Jagger spent about five years at the Bradford Corporation Electricity Works, in addition to war service, before going to Letchworth in 1929 as charge engineer. In 1942 he was appointed constructional engineer there, engaged in the building of the new power station, now in operation.

Lieut Col J. F. Todhunter, who has been troubled with ill-health for the past few years has, on medical advice, relinquished his appointments as director and general manager of Murex Welding Processes Ltd. in order that he may lead a more open air life which, he hopes will result in a complete cure. He is not severing completely his connection with the firm and his services have been retained as a consultant to the company. Col Todhunter joined Murex Welding Processes Ltd. in Oct. 1936. He was made general manager of the company in July 1946 and a director in Oct. 1948. He has worked actively on behalf of the welding industry for many years, being elected a member of the Council of British Welding Research Association in 1949 in which year he became chairman of the B.W.R.A. Finance Committee. He is continuing to serve in these offices and is also chairman of the B.W.R.A. Housing Association. **Mr J. M. Willey,** deputy general manager of the company since Oct. 1951, has now been appointed to succeed Col Todhunter as general manager. Mr Willey was trained, and qualified, as an electrical engineer with J. H. Holmes and Co., Ltd., later joining Metropolitan-Vickers Electrical Co., Ltd., as technical assistant. With the formation of the Welding Department at Trafford Park he was responsible for all sales, and jointly responsible for development work on automatic welding equipment, resistance welding machines, atomic hydrogen equipments and electrodes. After a period as managing director of Rockweld Ltd, he joined Murex Welding Processes Ltd as personal assistant to the general manager, later being appointed to the delegate board of the company. Mr Willey is one of the early members of the Institute of Welding and has served for a number of years on the council and other Committees of the Institute.

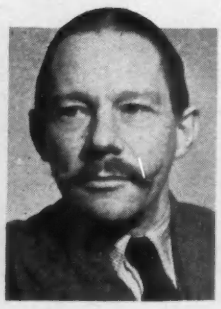
Previously with Marconi's Wireless Telegraph Co. Ltd., **Mr A. W. Dean** has joined A. K. Fans Ltd., in an executive position.

Dr Nicol Grozs, PH.D.(CAMB.), M.I.MECH.E., has been appointed to the London University Readership in Production Engineering tenable at the Imperial College of Science and Technology.

At present works manager of J. and H. McLaren Ltd., **Mr R. G. Hooker** is to become general works manager and director of the Brush Electrical Engineering Co. Ltd. His successor with McLaren's will be **Mr B. R. Cant** who is now personnel assistant to the Brush Group managing director. The Brush Group Ltd. also state that the following changes within the group will take place shortly: **Mr S. Webster,** now managing director of Bryce Berger Ltd., will become deputy managing director of the National Gas and Oil Engine Co., Ltd.;

Mr J. A. Spence

Mr A. H. Edney



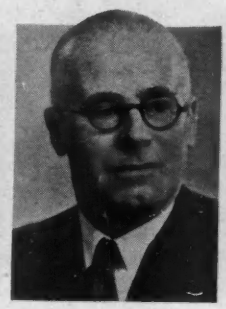
Lt Col Todhunter

Mr J. M. Willey

Mr R. G. Hooker

Mr E. H. Ball

Mr A. N. E. McHaffie



Dr C. Dannatt

Dr I. R. Cox

Mr G. A. Cheetham

Mr B. D. Giordan, now works director of Mirrlees, Bickerton and Day Ltd., will become managing director of Bryce Berger Ltd.; and **Mr D. G. Hawkins,** at present general manager of the National Gas and Oil Engine Co., is to be assistant group sales director.

To mark his retirement from the position of local manager at Todmorden and Hebden Bridge to the Yorkshire Electricity Board, **Councillor H. H. Sutcliffe** has been presented with a bedside cabinet by the staff and employees. Prior to nationalisation of the industry, Mr Sutcliffe was engineer and manager of the Hebden Royd U.D.C. Electricity undertaking for thirty years.

As from 1 Nov., **Mr S. Worsley** takes over the position of district consumer's engineer, at Cheadle, for No. 10 (South) district of the North Western Electricity Board. He succeeds **Mr A. C. Lowell,** ASSOC. I.E.E., who recently took up a post in the Board's No. 1 sub-area Power Sales Section. Mr Worsley gained early experience with the Manchester Corporation undertaking, and after war service, was for a time senior electrical engineer in the Corporation Housing Department, before joining the Board at Bury.

District engineer at Stalybridge to the North Western Electricity Board, **Mr H. J. Spring** is retiring tomorrow, 29 Oct, after 42 years service in the Supply Industry.

Our photograph below was taken on the occasion of the visit of the B.E.A. Central Authority and Area Board chairmen to Bristol for their conference there earlier this month. It shows some members of the party when they visited the Bristol Aeroplane Co.'s works where they saw Britannia aircraft in the final stages of assembly.

As has already been indicated in our pages, the Associated Electrical Industries companies have now been reorganised into four groups: B.T.H., Ediswan-Hotpoint, M.-V.E., and Overseas groups, the chairman of A.E.I., **Viscount Chandos,** becoming chairman of each of the groups. We reported on 7 Oct. that the group managing directors were: B.T.H., **Mr E. H. Ball;** Ediswan-Hotpoint, **Mr A. N. E. McHaffie;** M.-V.E., **Dr C. Dannatt,** and Overseas Group, **Dr I. R. Cox,** and we are now able to reproduce their photographs. The group managing directors are members of the A.E.I. Board (Dr Dannatt and Mr McHaffie have been appointed directors from 1 Oct.), and form, with the chairman, the Executive Committee of the Board. It is now stated that the group managing director of the Overseas group will be the A.E.I. nominee director of the Boards of A.G.E., First Electric and Vecor, and will become chairman of A.E.I. (India) and A.E.I. (Pakistan). The B.T.H. and M.-V.E. export companies will operate as at present. To ensure the closest liaison, however, the group managing director of the Overseas group has become chairman of the B.T.H. and M-V.E. Export Companies. We have already reported that as part of the reorganisation **Mr G. A. Cheetham,** managing director of Ferguson Pailin Ltd. has joined the board of Metropolitan-Vickers Electrical Co., Ltd. He continues as managing director of Ferguson Pailin Ltd. It is also now announced that **Mr F. J. E. Tearle** has been appointed a deputy to the group managing director of the Overseas Group. He has been on the board of the M-V. Export Co. for the past nine years.

Until recently assistant to the general works manager of the Northern Aluminium Co. Ltd., **Mr K. A. Maclean,** B.SC.(ENG.), A.M.I.MECH.E., has been appointed head of the Fabricating Division of Aluminium Laboratories Ltd.

Mr W. H. McFadzean, C.A., chairman of British Insulated Callender's Cables Ltd., left by the *Queen Elizabeth* last Thursday for New York. While in North America he will visit Canada in connection with B.I.C.C.'s important interests there which include Phillips Electrical Company (1953) Ltd. of which Mr McFadzean is chairman. He will return to this country early in November.

Mr D. C. Lorkin, joint managing director of Lancashire Dynamo and Crypto Ltd., who has recently undergone a major operation at St Thomas' Hospital Home, thanks his many friends for the flowers, letters and messages of goodwill sent to him. He will shortly be returning to his home at Northwood, Middlesex, for convalescence and hopes to be back at his office in the early part of next year.

In charge of the Publicity Department of A. Reyrolle and Co. Ltd., since 1946, **Mr T. W. Jackson** retires on 1 Nov. He first joined the company in 1911 as an apprentice and, after three years war service, returned in 1920 as a contracts engineer engaged initially on overseas contracts and later on home contracts. He was engaged on this work until the time of his final appointment handling many of the larger contracts for major power stations in this country, and was latterly a member of the B.E.A.M.A. Publicity Committee.

Members of the party of Central Authority and Area Board Chairmen visiting the Bristol Aeroplane Co's works

Mr W. J. Ebben

Mr B. L. Scott

Education and training officer of the Fraser and Chalmers Engineering Works of the General Electric Co. Ltd., **Mr W. J. Ebben** has retired after 37 years' service with the company. Mr Ebben joined Fraser and Chalmers in the Electrical Department in 1917 and in 1920 was appointed works engineer. At the same time he was given charge of pupils and apprentices, a post which he held until his retirement. He initiated the Works Safety Committee, and after the second world war was its chairman and secretary. He was chief of the Works Fire Brigade from 1920 until 1945, and was also A.R.P. officer during the war.

George Ellison Ltd. have appointed **Mr B. L. Scott,** B.SC., A.M.I.E.E., as their engineer-representative responsible for the sales of their switchgear and hydraulic values in Northern Ireland. Born in Ireland, Mr Scott was educated at Campbell College and at Queen's University, Belfast. He served an apprenticeship with Hugh J. Scott and Co., Ltd., to whom he returned after an intervening period in the teaching profession. He joined George Ellison Ltd. in Jan. 1951, initially on the internal staff at the works, and later on the outside sales staff, Birmingham and district sales office.

To give greater service to customers in Nottingham and district, **Mr J. N. Griffiths,** who has previously handled the Electrical Plant and Apparatus business from B.T.H. Sheffield Office, is now located in the firm's Nottingham premises, 71-73 Lower Parliament St.

OBITUARY

Mr C. W. Emanuel, D.F.H., M.I.E.E., district manager at Sutton to the South Eastern Electricity Board, died on 16 Oct, aged 58. He served at Hendon and Watford, and in 1936 became engineer and manager of the Workington Corporation undertaking, a position he held until 1946 when he became district officer to Sutton and District Electricity Supply, London and Home Counties J.E.A.

Mr N. Laws, who was chief accountant with the former North Eastern Electric Supply Co., Ltd., until his retirement some years ago, has died, aged 70.

Mr H. V. F. Hargreaves, a director of Aerialite Ltd., and managing director of Aycliffe Cables Ltd., of Johannesburg, died on 15 Oct., in Johannesburg.

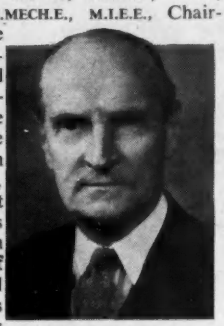
It is with regret that we report the death on 18 Oct of **Mr Edward Neville Bray,** in his 83rd year. Mr Bray joined Col Crompton as a pupil in 1889 and later he spent a short period in Australia on the company's business. He opened the Glasgow office of the company and remained as manager until 1902. With two other Crompton pupils—Mr F. R. Markham and Mr F. E. Reiss—he founded in 1903 the firm of Bray, Markham and Reiss Ltd., and remained with that company until the retirement of his co-founders. Subsequently, in 1922 he formed a new Company, E. N. Bray Ltd, making a wider range of control gear, with which he was actively engaged both as a designer and in the management of the business until his retirement at the age of 75. Although after his retirement he ceased to take an active part in the company, he maintained a keen interest in its affairs.

The Electrical Industry has lost another of its "grand old men" by the death on 18 Oct., of **Mr Theodore Stevens,** B.MET., M.INST.C.E., M.I.E.E., F.AMER.I.E.E., in his 90th year. A consulting engineer for the major portion of his career, Mr Stevens undertook such work in South America, Egypt, Palestine, Spain and many other countries. Educated in the U.S.A., he was early associated with research work for the Cowles Aluminium Co., and in 1889 joined the Metal Reduction Syndicate in this country, operating the Hall aluminium process. From 1892 to 1898 he was concerned with electric machine design for J. E. and H. Gwynne, Easton and Anderson and Thames Iron Works. Subsequently he was engaged on railway electrification work for the British Thomson-Houston Co., on the Central London Railway, and the Great North and Central Railway. It was in 1912 that he took up consulting work on his own. A man whose integrity was respected throughout the industry, Mr Stevens had a wide range of interests, and was a frequent contributor to the ELECTRICAL TIMES. He acted as secretary of the Association of Non-Statutory Electricity Suppliers and Distributors which was formed in 1939 to oppose certain of the recommendations of the McGowan Committee's Report on Reorganisation of the Electricity Supply Industry.

Mr W. C. Stevens, general secretary of the Electrical Trades Union, died in hospital on 24 Oct, a week after he had been injured in a car accident when returning from a meeting. He was 50. Mr Stevens was first elected general secretary of the Union in 1947 and was re-elected unopposed in 1952 for a further term. Born in Woolwich, he started work in the Electrical Maintenance Department of a film production and renting company on leaving school. Later he went into the contracting industry but returned to studio work. He became a member of the E.T.U. about 26 years ago, and occupied most positions that fall to the active trade unionist. A shrewd and sound negotiator with considerable administrative ability, Mr Stevens was frequently "militant" in his attitude, particularly concerning alleged grievances of the electricians, but he won substantial advances for his union members. Yet in spite of hard-hitting negotiating work he retained the friendship of many in the Industry who disagreed with his politics.

Mr W. G. Hodgson, A.M.I.E.E., formerly managing director of the firm of that name, died on 22 Oct, aged 86.

It is with the profoundest regret that we learn of the death on 25 Oct, at the age of 69 of **Mr H. Nimmo,** C.B.E., M.INST.C.E., M.I.MECH.E., M.I.E.E., Chairman of the Southern Electricity Board since its formation. There was no more popular man in the industry, for his quiet friendliness gained for him a large circle of friends, and even after his serious illness early last year, he resumed his strenuous round of activities and wide interests. He achieved distinction in three spheres: he was responsible for the setting up of the organisation of the Southern Board, while as an engineer he will be remembered for his work in Burma, and at the Electricity Commission. He served with the latter from 1929, for many years as chief engineering inspector, and from 1945 as an electricity commissioner. He was in Burma from 1909 until 1929, apart from war service, with the London Electrical Engineers. He went out as electrical engineer to the Irrawaddy Flotilla Co., and following a period as assistant engineer with the Rangoon Electric Tramway Supply Co., became officiating electrical inspector to the Government of Burma. After the war he returned to Burma to become electrical adviser to the Government, being also chief electrical engineer and officer-in-charge, Burma Hydro-Electric Survey. In more recent years Mr Nimmo served on the councils of the I.E.E., E.R.A., E.D.A., and the Engineers' Guild; he was president of A.S.E.E. in 1946-48 and chairman of E.D.A. in 1952-53. He also paid a return visit to Burma earlier this year as a member of a trade delegation. A memorial service to Mr Nimmo is to be held at the Queen's Chapel of the Savoy, Savoy St, W.C.2, on 4 Nov, at 12 noon.



Mr H. Nimmo

Motoring Made Easier

COMPONENTS AND EQUIPMENT AT THE MOTOR SHOW

EARLS COURT, London, is at present the Mecca of motoring enthusiasts where the 39th International Motor Show staged by the Society of Motor Manufacturers and Traders is in progress.

The show follows its traditional layout with the cars, caravans and marine craft on the ground floor and the transport service equipment, accessories and components in the gallery.

Battery Chargers

On stand 487, Westinghouse Brake and Signal Co., Ltd., one of the pioneers of metal rectifiers, are showing a new range of "Westalite" battery chargers which provide garages with a promising additional source of income from an overnight battery charging service. The new chargers are exhibited in sizes with outputs ranging from 12 to 2,400 W. They are built into an attractive metal case for wall mounting with a recessed panel for instruments, fuses, switches and terminals. Of great interest to the owner driver is the "Westric" home charger which is easily mounted on the garage wall and using current from the house service mains will charge the car battery overnight. The "Westric" automatically adjusts itself to charge either 6 V or 12 V batteries.

Models suitable for charging a single 6 V or 12 V battery at 1 ampere to larger garage and service station units are featured by F. C. Heayberd and Co., Ltd. There are mobile type chargers on wheels for easy movement. These are for up to 40 amps charging rates. For the safe operation of tools and inspection lamps the company are featuring a range of low voltage transformers. These are available for wall mounting and are in portable wooden cases. Heayberds are also displaying the prototype of an oil immersed waterproof low voltage transformer.

The Davenset display by Partridge Wilson and Co. Ltd., on stand 540 includes Davenset battery charger/engine starters, an engine starting rectifier for starting large engines in heavy vehicles with 12 V and 24 V systems and Davenset commercial chargers in which control is effected by transformer tappings, an important feature being the inclusion of a variable resistance in each charging circuit. Amongst battery testers shown is a new type voltmeter of the moving coil type designed for testing open circuit voltage between plates or using a cadmium electrode between the elements and the electrolyte.

Service Equipment

Crypton Equipment Ltd., one of the Lancashire Dynamo group companies, show on stand 500 an improved B X 300 self-contained Motor Analyser with new standards of simplicity and accuracy. They also have a new series of portable engine testing instruments including volt-ampere testers; coil and tach-dwell testers, exhaust-gas analysers, vac-fuel pump testers and condenser testers. Another interesting item is a new Background Display unit for engine test and line-up service incorporating a complete presentation of modern equipment for this testing and tuning service. On the battery charger side Crypton have an entirely new home charger in the form of a standard home charger, output 1-1½ amps and a "Major" model, output 2-3 amps. Both are for 200/250 V mains and charge 2, 6 or 12 V batteries without need of any adjustment. New item of electrical service equipment is the C 15 "Genareg" test bench—a self-contained bench unit costing less than half previous prices for auto test benches.

Runbaken electrical products on stand 477 with their displays of auto-electrical test equipment, accessories and ignition components are attracting attention. They are in addition featuring fast chargers, boosters and other battery charging equipment.

Batteries

Crompton Parkinson in the Accessories Section, stand 426, through Young Accumulator Co., Ltd., their associate company, have a representative selection from an extensive range of Crompton car batteries which incorporate several outstanding features. These are the grids made from a "Nilcrode" alloy and "Dri-Stor" micro-porous separators which are virtually indestructible and completely unaffected by immersion in acid. Battery bars with greater sectional area to give higher starting voltage, non-splash vent plugs with finger grips specifically designed for easy removal and tough moulded hard rubber container are features worth noting here. Incidentally this company has just introduced the new K7 range of commercial vehicle batteries which have a larger number of plates than hitherto. These work in conjunction with a double separation of wood and glass silk.

Batteries shown by Chloride Batteries on Stand 378 include some of the more popular Silver Exide batteries which have been re-designed with flush tops. A representative selection of "Double Life" batteries are shown combining technical developments that produced "Silver Exide." These "Double-Life" are covered by an unconditional guarantee of two years service or free life.

Edison Swan Electric Co., Ltd., have made a most interesting display of their Ediswan batteries which come in four varieties to meet all needs. There are Extra Life batteries which are covered by two year free replacement guarantee, Standard batteries, the Crown range and High Discharge batteries for motorists who have difficulty in starting their cars in cold weather. In addition they show examples of their ranges of car cables, lamp bulbs and the Tungar chargers.

A number of "Heavy Duty" and "Major" batteries are shown amongst other items on the Oldham Batteries stand together with some of the larger marine units by the firm. The Oldham "Major" battery incorporates "Fibrak" separators, X-metal grids and cold start-plates.

Car Radio

Car radio in the form of Ekco's new range Model CR 152 is an attraction on Stand 94. Model CR 152 has been designed by E. K. Cole Ltd. from a new six-valve superhet receiver employing an ingenious permeability lining system allowing instantaneous selection of three preset stations or manual tuning on medium and long waves. The receiver, power unit and speaker comprising the model comes in four versions to meet the need of any car whilst specially-styled versions for filling in the Humber, Hillman and Ford cars are available. A deluxe model CP 227/2 with push-pull output stage and two speakers has been designed for the Ford "Zodiac." An eight valve, all-wave superhet receiver with band spread tuning on short-wave and instantaneous selection of pre-tuned stations on medium and long waves, the CR 61 will attract the overseas motorist.

Pye Telecommunications have a new three-unit car radio which can be installed quickly and easily at any of Pye's Depots in Cambridge, Birmingham, Manchester, Nottingham, Bristol and North London, where customers can drive in and have the radio fitted within an hour or so at an inclusive cost of £28. (The set costs £23. 10s., the extra charge covers aerial installation and six months' free service).

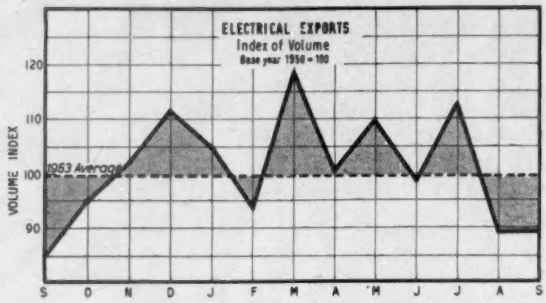
Metal Finishing

Of interest in a different way is the Pyrene display where, apart from their noted fire extinguishers and bumpers, the company have made a feature of their metal furnishing processes—"Bonderizing," "Parkerizing," etc., and have a working model of a typical "Spra-Bonderizing" machine as used in the motor industry.

Headlight dazzle is a most interesting feature of the Road Research and Motor Industry Research Stand. It shows visitors the effect of a car being driven along a country road at night and by a clever display shows the dangers of ill-adjusted headlights.

EXPORTS and IMPORTS

Statistics for September



SEPTEMBER'S exports of electrical equipment increased only slightly over the Aug. total. In fact the increase in volume is insufficient to affect the ELECTRICAL TIMES volume index, which remains unaltered from its Aug. value of 89. This, however, is a considerable improvement over last year's position when the volume index stood at only 85, especially when it is considered that the effective number of working days was the same.

In value, the total of electrical exports in Sept. was £12,519,349, just over £50,000 more than in Aug. This total is, however, that of Class D, Division 16 of the Official Accounts, to which we have added exports of domestic refrigerators and washing machines, resulting in the grand total of £13,211,466 given at the foot of the table below.

In last month's figures there were small reductions for certain heavy plant items, but for many domestic appliances exports were higher than in Aug. Apparatus in this category were vacuum cleaners, floor polishers, cookers, toasters, space heaters and electric irons. The total value of the latter amounted to £67,224 compared with £43,758 worth sent abroad in Aug. Corresponding figures for floor polishers were £89,128 and £55,550 respectively, for food mixers £58,126 and £39,167, for cookers £102,076 and £76,426, for toasters £27,513 and £15,952, for space heaters £32,367 and £24,315, and for domestic washing machines of up to 150 lb in weight, £209,586 and £126,424.

Of all the electrical goods exported in Sept., Australia took over £1,420,000 in value, South Africa more than £1,220,000 and India £1,217,000.

Description	Exports Value (£)			Imports value (£)	
	Monthly Average 1952	September 1953	September 1954	September 1953	September 1954
Generating Sets:					
Diesel up to 200 kW	408,225	249,525	248,239		
„ over 200 kW	214,949	172,928	312,466		
i.c. driven	31,920	14,620	9,352		
Steam turbine-driven	143,882	171,788	18,987	25,394	26,463
with other prime movers	31,520	94,819	73,112		
Generators	210,823	70,789	136,136		
„ parts	369,110	321,373	319,396		
Motors	892,465	808,965	743,133	42,734	31,938
Motor starters and controllers	234,035	188,740	157,207		
Convertors and rectifiers	103,602	106,453	83,995		
Transformers	873,260	895,659	722,404	24,822	174,820
Switchgear and Switchboards	1,291,656	1,094,916	1,076,718		
Batteries, primary and parts	212,536	161,856	300,739		
Fluorescent and Discharge lamps	53,194	55,580	61,997		
Other lamps	123,932	107,711	134,065		
Radio and Electronic gear	1,916,241	2,014,032	2,184,463	420,337	580,748
Telephone and Telegraph Plant	1,372,016	1,260,600	937,120		
Cooking Appliances and parts	114,943	107,100	209,847		
Space heaters	26,489	12,897	32,367		
Water heaters	32,963	21,171	16,378		
Other heaters and parts	128,498	127,647	136,576		
Welding machinery	86,132	75,386	70,178	11,356	9,741
Signalling and Bell equipment	53,722	81,944	33,970		
Commercial Instruments	135,473	124,981	163,259	37,545	57,464
House Service Meters	147,816	82,888	107,030		
Electro-medical and X-ray apparatus	118,910	100,174	106,109	69,902	35,430
Fans	110,447	105,291	95,864		
Vacuum Cleaners	159,303	133,240	150,518		
Other Appliances and parts	232,481	205,699	357,006		
Portable power tools	112,423	119,613	151,543		
Washing Machines up to 150 lb	443,379	323,825	209,586		
Power Refrigerators, up to 12 cu ft	565,985	526,738	482,531		
Telephone and Telegraph Cables	746,946	522,919	243,385		
Paper-insulated Cables	883,068	593,386	394,447		
Rubber-insulated Cables	622,124	285,626	358,175	10,040	10,222
Winding and similar wires	151,677	84,735	93,906		
Other Cables and Wires	276,939	175,511	182,740		
Accumulators and parts	452,491	273,218	295,612		
Insulating Materials	165,900	105,473	109,458		
Electrical Ware	103,886	60,679	48,730		
All other articles	1,595,762	2,333,498	1,642,561	178,730	466,946
Total	16,051,060	13,146,215	13,211,466	820,860	1,393,772

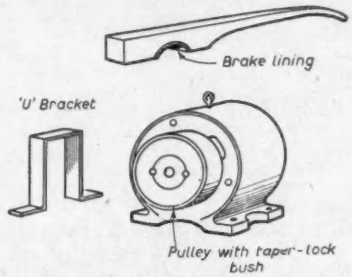
* Including models of up to 250 lb in weight

PROBLEMS AND PRACTICE

In Engineering

Incomplete Motor Repairs

THE interesting note by J. R. on the above subject (7 Oct. issue) reveals the practice, far too common in small repair shops, of passing a motor out after a repair with only a no-load run test. Probably the main reason for such a perfunctory test is the lack of suitable and quickly assembled load test equipment so the following simple method of making a short time brake test was devised. To fit to the motor shafts a brake drum can itself be quite a job when shaft diameters and keyways vary so much between motor sizes, so a J. H. Fenner and Co., Ltd., type of flat pulley, with "taper lock" interchangeable bushes for each size of shaft, is employed. The design of the taper bush enables the pulley to be assembled on any motor



Arrangement of pulley mounted on the motor shaft with a taper lock bush to provide load testing of small motor load

shaft in a few minutes. The bush is split longitudinally and tightening two set screws draws the bush into the tapered bore of the pulley causing it to grip the shaft securely without the fitting of a key. The interchangeable bushes, which are not costly, are obtainable in sizes to fit standard motor shaft.

A brake shoe was formed by fitting a strip of brake lining to an oak lever shaped to fit the curvature of the pulley. The motor is bolted to a bedplate with the brake pulley in line with an inverted U bracket, and the end of the brake lever is placed under this bracket and pressed downwards thus applying pressure between the brake lining and pulley. An ammeter in the motor circuit enables the brake load to be applied evenly up to the full load rating. The test cannot of course be too prolonged due to the heat generated at the brake, but is sufficient to check the motor up to full load and, in the case of d.c. machines, reveals any defective commutation due to incorrect brush position or other faults.

This method is not intended for the regular motor repair department where complete test beds are employed, but for the small maintenance depot engaged in occasional overhauls, cleaning and scheduled inspection of motors at regular intervals.—*T. H. Snelson.*

* * *

Every engineer has a story to tell; why not tell yours on this page? We welcome contributions to this feature, and those published will be paid for at our standard rates. Problems which are encountered and overcome in day-to-day maintenance or installation of electrical plant; useful methods and techniques developed for specific jobs, or current practices, all make instructive reading for others. We will also consider for publication problems requiring an answer. Sketches are often helpful and need only be rough, as they will be redrawn before use.

I WAS interested in J.R.'s comments in these columns (7 Oct. issue) regarding the alleged inadequate testing carried out by repairers after the necessary repairs to a motor have been completed. I certainly agree that instances such as described under the heading "Incomplete Motor Repairs" do unfortunately occur and a "complete satisfactory duty test" would reveal such errors before delivery to the user.

The range that artificial loading equipment would have to cover in any normal repair shop is quite formidable when handling anything from "fractionals" up to 200 h.p. machines. The repairer must provide electric power for testing at 110, 230 and 460 V d.c., also 110 and 230 V single-phase and 400 V, 3-phase. These are the minimum requirements and (although becoming less common) 200 V, 2-phase is sometimes necessary. How is one to decide upon the capacity of the supply at each of these voltages to enable motors to be load tested? Moreover, does J. R. suggest that an order for the repair of a 300 h.p. motor should be turned away because the maximum testing capacity is say 200 h.p.?

The case quoted of the d.c. 4-pole shunt motor which ran fairly well on light load but sparked badly on full load should not have left the repairers in that condition. The error in the interpole polarity, or in fact any other coil for that matter, would have been detected if routine checks had been carried out during assembly. If a repairer organisation lays down a test routine and rigidly carries it out, incorrect connections can be eliminated. If a motor user would state the direction of rotation required of any d.c. or single-phase motor sent for repair this would be a big help to the repairers and avoid any inconvenience to himself afterwards.

It frequently happens that the internal connections of a motor are put out of order by the user having to reverse the direction of rotation when re-installing. When the direction of rotation required is not known a label should be attached by the repairer giving instructions for reversing, but it is better to avoid this by informing the repairer of the direction required. This last point has no direct connection with the case quoted by J. R. but may be of general interest.—"*S. X.*"

Earth Detector

WE recently installed a bore hole pump in one of the oilwells in the field. It is of American manufacture, the motor operating at the rather unusual voltage of 880 V three-phase. It is supplied from an 11 kV spur through its own transformer with a delta secondary, and some 2,000 feet of flexible armoured cable which goes down the well. The 880 V circuit is, of course, unearthed, and while we appreciated that on an unearthed system the first earth fault is "free," on the second fault the problem of locating two separate faults at the same time arises. The pump, being a piece of production plant, is on virtually continuous operation, and the problem was to keep an eye on the circuit without interfering with operation.

Search through our store revealed a number of 750 V neon potential indicators, which light up at about 110 V, and, when tested, showed no distress at 1,000 V. We arranged three of these in star across the lines, and earthed the star point though a fourth neon indicator. We found that a 30 amp, front wiring, porcelain fuse base was most suitable for holding these indicators, which are only 3½ in. long by ¾ in. diameter, and consequently four such bases mounted on an s.r.b.p. base in c.i. box made an excellent indicator unit. Holes were drilled in the lid opposite the indicators, and covered on the inside with "Perspex."

Its operation is quite straightforward. When the system is healthy, the cable capacitance to earth holds the "neutral" at earth potential, so the three-phase indicators will each have 500 V impressed on them, and burn with equal brilliancy, while the earthed indicator, with no volts across it, will remain dark. If one phase becomes earthed, its indicator will be in parallel with the earthed indicator, and these two will be subjected to 380 V, while the other two continue to carry 550 V each.

Our application is relatively simple, in that it is for a single balanced load with plenty of capacitance to fix the neutral—the charging current is about 20 mA. It is thought that this arrangement may be of use on unearthed systems for indicating the presence of the first earth fault which may then be located as opportunity offers, and before a second earth fault has had opportunity to demonstrate its existence.—*F. E. M. Hardy.*

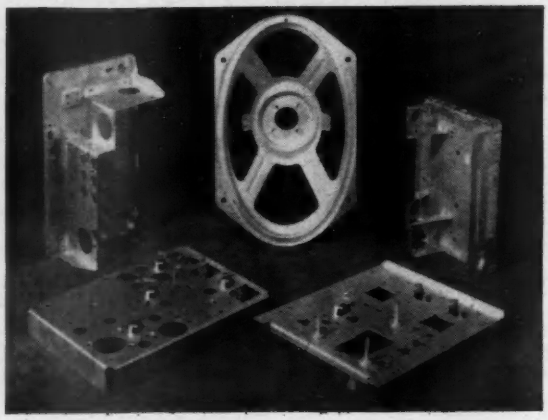
Equipment for Industry

Tin-Zinc Plating

AMONG those materials used for protecting steel from atmospheric corrosion—tin and zinc are prominent. However each has its disadvantages. In the case of tin, due to its high cost, the plating is of necessity thin and its porosity leads eventually to rusting, whether the coating is applied by hot-dipping or electro-deposition. Similarly, with zinc, due to sacrificial action by which it affords protection, corrosion inevitably occurs. Alloying tin and zinc provides a plating medium having the effect of minimising the disadvantages outlined, and provides a coating which looks not unlike cadmium plating and is in fact cheaper to apply.

The use of tin-zinc plating has steadily increased over the last few years, being used for many purposes. The TIN RESEARCH INSTITUTE, Fraser Rd, Perivale, Greenford, Middlesex, last week staged an exhibition at which a variety of plated components were displayed. Extraordinary throwing power is a feature of this plating; in one case, without the use of additional anodes, in a 2½ in. internal diameter component with a blind end, penetration had occurred the whole depth of 6 in. When polished, a high lustre with good lasting characteristics gives a finish almost like nickel, and, indeed, for tools and planes, tin-zinc plating has been used as a nickel-substitute and good results obtained.

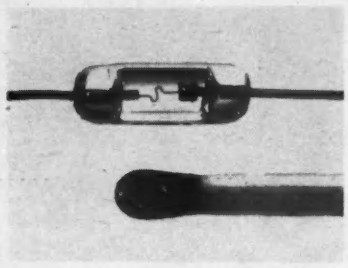
A feature of the plating is that it will take solder, a distinct advantage over cadmium or zinc. It will also take paint. Any further information required is obtainable from the Institute.



Tin-zinc plating is used extensively for radio components

Fusion-sealed Diodes

CONTAMINATION by foreign substances and minute movements of the contact point are probably the main causes of failure of germanium point contacts. It is, of course, with these points in view that envelopes of germanium diodes are designed and the use of accessory materials such as solder and fixing cement avoided, since they may cause chemical contamination. The possibility of producing true glass to metal seals for the leads has not been greatly exploited since the high temperatures required, change the characteristics of germanium. MULLARD LTD., Century Hse, Shaftesbury Ave, W.C.1, have developed a method of fusion sealing which is claimed not to affect the germanium and the first of a new range have been produced. These are the OA70 television diode and the OA73 low forward resistance, high frequency diode for communications and industrial use.



The diode is shown here compared with a match-head

New Welding Electrode

SUITABLE for use with d.c. automatic welding machines designed for continuous coated electrodes, the "Coilex," a new electrode is of the double wound flux extruded type. Although developed for welding mild and medium tensile steels, it can be used for either butt or gravity welds in all classes of steelwork normally considered suitable for welding. Already approved by a number of classification societies, the electrode is now in full-scale production by MUREX WELDING PROCESSES LTD., Waltham Cross, Herts.

The makers claim that a special construction employed on the electrode, makes it particularly robust. Instead of following a conventional helix, the outer wire-winding of Coilex is applied with a series of "sets" to form a number of minor projections above the surface of the extruded flux so that good electrical contact with the jaws of the welding head can be maintained.

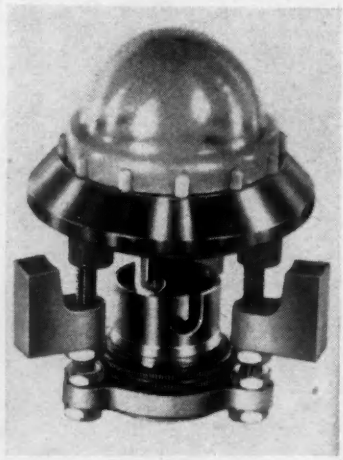
Novel Wiring Cleat

WITH increasing complexity of circuitry the problem of securing wires neatly yet permitting easy inspection and maintenance is certainly one of major importance. Recognising this, EVERSHED AND VIGNOLES LTD., Acton Lane Works, Chiswick W.4., developed a moulded cleat, for use on their own switchboards and apparatus having intricate and large wiring circuits. The cleats are now available commercially.

The basic moulding is fixed in position by two bolts. Grooves provide accommodation for up to five wires, these are held in position by a cover which is secured to the moulding by means of two metal clips. If more than five wires require supporting, the basic mouldings may be stacked in series, the back of each substituting for the cover which is then placed over the last moulding.

Panel Signal Light

A NEW panel-mounting signal light which can be seen throughout 180° is now obtainable. Easily installed, it has been designed so that the 15 W standard pigmy bayonet-cap bulb, which it accommodates, may be replaced from the front of the panel. A solid brass chromium-plated bezel supports the screw-in plastic lens which is available in seven different colours. Mainly for use on power-station switchboards and control panels, the lights may also be used in hotel, ship and hospital call systems. Priced £1. 1s. the light, Cat No. SL100, is produced by ARCOLECTRIC (SWITCHES) LTD., Central Avenue, West Molesey, Surrey, and is supplied without bulb.



Available in many colours this light is suitable for control panels

Get your "Disney lights" now

"DISNEY lights" a new lighting set of Mazda decorative lamps has been introduced in time for the festive season by BRITISH THOMSON-HOUSTON CO., LTD., Crown Hse, Aldwych, W.C.2.

Priced at 29s. 8d. per set including purchase tax, these "Disney lights" come in sets of twelve lamps, each lamp bearing a colourful design from Walt Disney's wonderland. Lamps are linked by green covered wiring with red "berry beads" for the attachment of lamps to branches and twigs of the Christmas Tree.

The attractive box itself makes a striking counter display and carries on its base details of other Mazda equipment. An amusing instruction book is included. "Disney lights" are for 200/260 V supplies.

"Disney lights" for Christmas displays

New G.E.C. Contemporary Fittings

As we go to press we learn that the General Electric Co., Magnet House, Kingsway, W.C.2, will introduce later this week over 75 new contemporary lighting designs.

TRADE PUBLICATIONS

METALS.—Heavy Alloy for the aircraft industry produced by the General Electric Co., Ltd., Magnet House, Kingsway, W.C.2 is described in a booklet of that name.

TELECOMMUNICATIONS AND ELECTRONICS. —Publications 834/3/CS, 1252 and 1284 issued by Automatic Telephone and Electric Co., Ltd., Strowger Works, Liverpool 7, deal with Strowger 25-line private automatic telephone exchange equipment, electromatic vehicle actuated traffic signal controllers, and a non-technical description of the "Rythmatic" tripple control system.

METALS.—Electro-Alloys Ltd., 47 Brunel Rd, London, W.3, have issued a new brochure describing a large section of their manufacturing programme.

MILLING MACHINERY. — Publication G254 by International Combustion Products Ltd., 18 Woburn Place, W.C.1. describes IC equipment for grinding, screening, separation, filtering, thickening, pumping and classifying.

Christmas presents by Hurseal

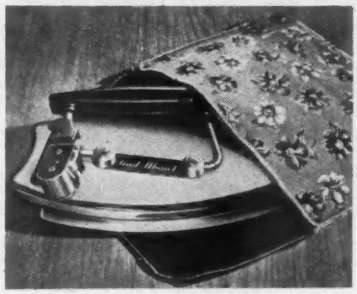
A WORTH-WHILE Christmas line for dealers are some of the products of HURSEAL LTD., 229 Regent St, S.W.1. Their washable electric bedsheets attractively packed in cellophane cartons make acceptable displays. The single bed size (60 in. by 33 in.), costs £8. 17s. 1d., and the double bed size £15. 2s. 2d. Two other lines which the company ask the trade to order well in advance are the room thermometer in either black or ivory, which retails at 17s. 6d. (retail discount 33⅓%) and a more elaborate one in black and chromium which retails at 27s. 6d.

Silk pouch to aid Gad-About Sales

ALWAYS a good line for Christmas stocking, the Gad-About travelling iron is now available in an art silk pouch in a floral design that will appeal to feminine taste.

Features of the Gad-About are its full size sole plate folding handle and light weight (1½ lbs). For use on a.c./d.c. the Gad-About is made by ELGA PRODUCTS LTD., Railway Place, Wimbledon, S.W.19 to sell at £2. 2s. including 1s. purchase tax on pouch.

This attractive art silk pouch for the Gad-About will appeal to the woman customer



Simplex Prices Changed

AS from 25 Oct. prices of Simplex 30-amp cooker control units have been substantially reduced.

SIMPLEX ELECTRIC CO., LTD., Broadwell. Oldbury, Birmingham, say that new prices for these units and for spare plugs are as follows:

Cooker control unit 3802 (15 amp switch socket), from 42s. to 38s. including plug.

Cooker control unit 3803 (13 amp switch socket), from 38s. to 30s. including plug.

Cooker control unit 3806 (15 amp shuttered socket), from 38s. to 34s. including plug.

These control units are finished in cream or white and can be supplied with rewireable fuses or cartridge fuses at the same time.

Prices of spare plugs are as follows:

List 27000 (15 amp), reduced from 44s. to 41s. per dozen.

List 13631 (13 amp), reduced from 53s. 8d. to 46s. per dozen.

For the Electrical Trade

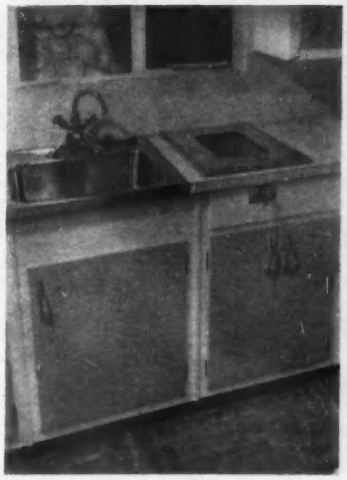
Build in a dishwasher

BUILT-IN kitchen furniture is something which nearly every housewife wants and an electric dishwasher even more so. The model B8 dishwasher by ARCASON PRODUCTS LTD., Electroflo Hse, Abbey Rd, Park Royal, N.W.10, is ready for fitting into the sink bench simply by cutting an 18¼ in. by 14¼ in. hole. It is merely fixed down by screws provided and is ready for connection to hot water supply, drain and electric supply.

If the customer has not achieved her labour-saving ideal of built-in furniture the Arcason Model B9 is the job! This is the machine complete in a neat compact white stove-enamelled cabinet measuring 36 in. by 17 in. by 21 in.

It is the proud claim of the makers that their "Domestic robot" can do all the customer's washing-up better than she can herself in only 3 minutes. The machines are for standard a.c. supplies or for other non-standard and d.c. supplies. Size of the motor is ¼ h.p. It is simple to operate, using only one switch and handles everything from the greasiest pans to most fragile glass

The model B8 is on the right of the sink unit



NEWS OF THE WEEK

Dry-Shaver Market is Expanding

OLD AND NEW MANUFACTURERS HAVE MOUNTING CONFIDENCE

A DEVELOPMENT in the electrical retail trade which may not have been recognised easily, is the increase in production and expanding market for dry shavers. Annual production has risen considerably since the war and manufacturers are confident that there is plenty of scope to extend sales among the 15 million or more of the U.K.'s male population. Not long ago a few manufacturers held the market for themselves with limited competition, but the picture has changed very markedly in the past year or so. At least two companies have entered the field and a number of new models introduced. Only a fortnight ago we reported the formation of Sunbeam Electric, British subsidiary of the American concern, whose first introductions in this country were their two dry shavers. It was not long ago either that Ronson branched out into new fields, and chose to produce and sell a dry shaver. Just over a year ago Remington brought out a new model, and it is expected that very soon yet another shaver will be introduced to the public by Rolls Razor.

Production of these razors last year was said to have exceeded 380,000 as compared with 310,000 in 1952. In 1948 output was only a fifth of the 1952 figure. Manufacturers are forecasting that their sales this year will be far in excess of previous years. Competition is exceptionally keen and not confined to the familiar attractions of price and design. One very popular sales technique is the free-trial period. This usually takes the form of a week or fortnight loan for practical test in the home. The dealer organises and is responsible for the trials but those firms who have adopted this method will reservice those returned and give them back to dealers for further loans. Another is the part-exchange system whereby old razors of whatever type are exchanged for a new dry-shaver. Competition is also apparent in the guarantee terms offered by manufacturers with each sale. It certainly seems that the dry-shaver is becoming increasingly popular in this country, and that there is abundant confidence among manufacturers as to the future of their products. Dealers might do worse than study the potentialities in this field.

French Productivity

SOME of the difficulties which advocates of higher productivity meet in France and Britain were discussed at a dinner in Birmingham recently. The Birmingham Productivity Association entertained the 13 members of a visiting French productivity team, who are on a 6-day visit to the city and the Midlands.

INTENSIVE SALES DRIVE IN U.S. BRINGS IN ORDERS TOTALLING $5,500,000

BACK in this country after a two-weeks' tour of the United States and Canada, Mr Gordon Fillery announced that he had secured orders for some 92,000 of Fillerys (G.B.) Ltd.'s combined vacuum cleaner, floor polisher and scrubber, which in terms of cash means about $5½ million. This was his sixth Atlantic crossing this year and the culmination of an intensive sales drive which possibly outstrips any other advertising campaign conducted in respect of a British appliance in the States. During his visit he covered all the major cities and followed a large advertising programme with public demonstrations. Most prominent among promotional efforts were programmes on the television network twice a day. This was the company's first major attack on the American market, although considerable success has been achieved over the past few years in Canada where they claim to have 35% of the floor polisher business. Subsidiary companies have been established in both countries.

Telling the ELECTRICAL TIMES of his American tour, Mr Fillery said it was probably his most successful sales trip so far. The figures certainly bear that out, but this achievement is the more remarkable because the U.S. market has been notoriously difficult for manufacturers of domestic appliances, and few British firms have gained much success in the domestic market. Moreover, the description of this latest tour gains added significance when it is known that Mr Fillery has travelled literally all over the world. After only a week in this country he set off again last weekend for a four-week stay in S. Africa, where Fillerys have been operating for some 18 years, have their own factory, and have secured about 70% of the polisher market. From there he travels to Australia where an order for £250,000 worth of appliances has recently been secured, and where an agreement has now been concluded with Ogden Industries for on-the-spot production in the Commonwealth. At the present time about 70% of the company's output goes for export, and successes achieved have been attributed to their ability to adapt themselves and their machines to local requirements.

Nor has the home market been neglected. A novel idea has been put into practice whereby some 50 or 60 previously unemployed chorus-girls have been given jobs as demonstrators. This, we are told, has proved an outstanding success. The girls, after thorough tuition, have travelled the country demonstrating the appliances in all the major cities and towns and have been showing excellent results. The scheme is being continued, and sales both at home and overseas are attaining record figures.

I.E.E. issue New Model Contract Form

A NEW Model Form of General Conditions of Contract has been prepared by the I.E.E.'s Committee on Model Forms and has been published under the authority of the Council of The Institution. It is known as Model Form E—Home Cable Contracts, with Installation, and has been compiled specifically for use in cable contracts which include installations. These contracts have been provided for until now by the recommended adaptation of Model Form A—Home Contracts with Erection. It is complementary to Model Form D—For Sale of Cables without Erection, which is still available. Copies of the new Form E can be obtained from the I.E.E. Secretary, Savoy Place, W.C.2, and cost 5s.

Hold-up at Docks

AMONG goods reported to be held up in London as a result of the dock strike are consignments worth £370,000 from the cable-making industry; £140,000 worth of machine tools; £84,600 worth from the valve industry; and electronic equipment valued at £90,000.

Tram for Posterity

A 30-years-old double-decker tram formerly operating in Blackpool is to be sent to Massachusetts for the museum run by the New England Electrical Tramway Historical Society. Blackpool Transport Committee decided this last Friday.

Future Plans of World Power Conference

THREE countries were admitted as members of the World Power Conference during the 1954 meeting of its International Executive Council. They are Paraguay, Spain and Thailand. This announcement was made last week, and at the same time details of other decisions taken were given. The dates for the Fifth World Power Conference (a plenary meeting) to be held in Vienna in 1956 were fixed as 16 to 23 June. After the technical sessions, a series of technical tours will begin on Monday, 25 June. Suggestions for the technical programme are being discussed.

Further invitations accepted by the International Executive Council included sectional meetings to be held in Yugoslavia (1957), Canada (1958) and Switzerland (1959). Consideration of an Australian sectional meeting for a later date was postponed. The invitation of the French National Committee for the Council to meet in Paris during the first week of June 1955 was accepted.

Changes have been announced in the membership of the British National Committee of the W.P.C. Mr Norman Elliott has become second representative of the B.E.A. on the Committee, while Sir Claude Gibb has been replaced as representative of the I.Mech.E. by Mr P. L. Jones.

Newcastle Firm plans to Double Output

FOLLOWING the steadily increasing demand for their products during the past years and the larger sizes of equipment now being manufactured, Sturdy Electric Co., Ltd. are to build a new transformer factory and fabrication shop.

The company's existing premises have become wholly inadequate, but when the new factory eventually becomes available for production, it is hoped that the present capacity will be doubled. As far as can be foreseen at the moment, the new factory should be ready for occupation in the spring of next year. After that date the present home of the company at Burnopfield, Newcastle-on-Tyne, will be retained for light assembly. Meanwhile they are being reorganised in order to achieve the maximum rate of production, and to keep delivery periods as short as possible.

OFFICIAL PUBLICATIONS

E.R.A. REPORTS. G/T260: Note on Nature of Gases Liberated during Arcing in Oil Circuit-breakers, by C. E. R. Bruce, 6s. 4d.; G/T281: Series Breaks in Circuit-breakers: Technique for Measurement of Voltage Distribution, by F. O. Mason, 10s. 9d.; L/T289: Oriented Polystyrene Film Capacitors. A Major Cause of Premature Breakdown, by H. F. Church, 7s. 9d.; L/T296: Dielectric Properties of Silicone Liquids and Greases—III, by E. Rushton and J. V. L. Parry, 7s. 9d.; L/T305: Investigation on Aluminium Electrolytic Capacitors and Development of New Type of Aluminium Oxide Capacitor, by G. C. Robinson, 15s. 4d.

I.E.E. MODEL FORM OF GENERAL CONDITIONS OF CONTRACT—E. (see page 642).

U.K. BALANCE OF PAYMENTS, 1946-1954. Cmd. 9291. Published by H.M.S.O. 2s. 6d.

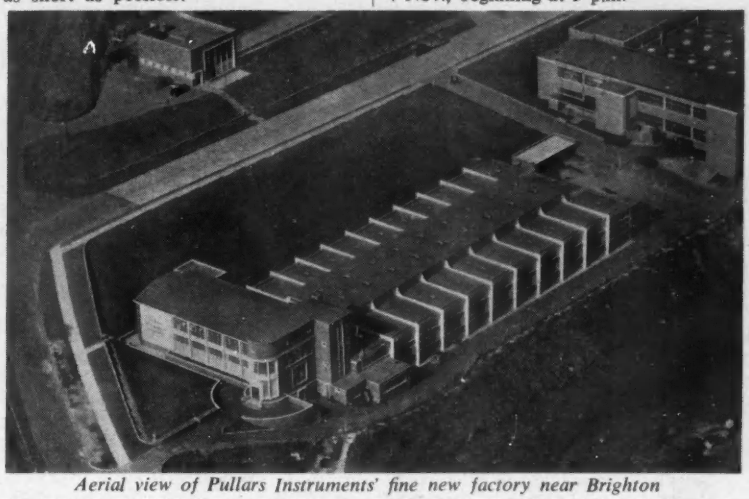
All about TV Aerials

TWO lectures on Television Aerials, their Design, Construction and Erection are to be given by Mr P. Jones, of Aerialite Ltd., in Aberdeen. The talks will be given at the Gloucester Hotel on 3 and 4 Nov., beginning at 3 p.m.

Ultra-Modern Timer Factory at Brighton overlooks South Downs

THE healthy state of Britain's industrial progress is well reflected in the number of new factories springing up on estates up and down the country. Main feature which stands out in the erection of two which we note this week, is not so much the economic progress which initiated larger premises, but the spirit of co-operation between management and employees evident in both schemes; and this at a time of labour unrest in other spheres. At Hollingbury, Brighton, where Smith's subsidiary, Pullars Instruments, have just opened a new factory, many employees turned up at the factory during their holidays asking to be allowed to help in preparing the premises prior to opening day. The changeover was carried out during the annual holiday period, and on th first day production was greater than the average achieved at the old works.

This modern building, overlooking the South Downs, is constructed of prestressed concrete and occupies an area of nearly 2½ acres. Actual floor area is 42,600 sq ft. The move became necessary because of the considerable increase in demand for the company's products, and it is hoped that the result will be a doubling of output. The factory will be devoted exclusively to the production of Smith's well-known Pingers, Ringers, Barometers, and Smith's new electric cooker and washing machine switches. Special feature of the new works is the canteen, said to be one of the finest factory canteens in the country. Impressive too is the colour scheme devised for plant, fixtures and fittings.



Aerial view of Pullars Instruments' fine new factory near Brighton

Company build Their Own Factory at Uxbridge

ANOTHER fine example of co-operation between employer and employed is to be found on the new industrial estate at Uxbridge. There Lighting, Heating and Traction Supplies Co., Ltd., have opened a new factory, moving from their previous home in Park Lane, Harefield. Work started on 17 June last, and although bricklayers, plasterers and plumbers were employed, the rest of the constructional work was done by Mr R. H. Markes, managing director, and about six of his staff, working in their spare time often until late at night and at weekends. Two bays of the factory, which will eventually cover 10,000 sq ft, have been built, and production started on Monday of last week. Another bay and the office block and canteen have still to be built.

The company was established in 1922 in London as wholesalers, and later started manufacturing on their own account in the field of wiring accessories, switch assemblies, pressed tools, meter boards and the like. They moved to Harrow in 1940 and subsequently to Harefield, where one of the main factors which influenced the present move was labour problems. The company has still more ambitious plans for the future, branching out into other spheres of manufacturing activity. In the meantime the order book is overflowing, and there is a healthy export business with S. Africa, Ceylon, Australia, Europe and the Far East. Greatest success to date has been achieved in S. Africa, which Mr Markes visited in 1952.

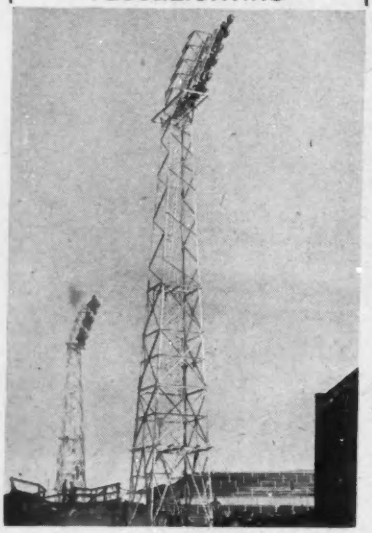
Do Boards' Showrooms pay Their Own Way?

A SEPARATE statement should be included in the annual accounts of Area Boards showing details of the business dealings of showrooms, the Co-operative Union Parliamentary Committee is suggesting in evidence to be submitted to the Committee on Electricity Supply in England and Wales. The Co-operative Committee has no particular complaint against the operation of the Board's showrooms, but feel that suspicion inevitably arises under present arrangements as to whether those showrooms were self supporting. The question is asked whether the service centres pay their way or were they being subsidised by revenue derived from the sale of electricity? It is pointed out that hire purchase terms were sometimes lower than those offered by other retailers in respect of the same appliances. The Committee recommend that a statutory obligation be imposed on Boards to include in their accounts a separate statement indicating the profit or loss on the operation of their appliance selling sections. There should also be certificate from the auditors showing that all charges properly appropriated in such sections had been duly debited against them.

NCB SALES OFFICES

NEW Regional Sales Organisation of the National Coal Board comes into operation next Monday. As mentioned in the Board's latest annual report, sales managers in each region will be responsible for the sale of nearly all coal consumed in that area, and consequently buyers will need to deal with only one office irrespective of the number of coalfields supplying them. The respective regional managers will be communicating with buyers describing the new arrangements.

NEW SLANT ON FLOODLIGHTING



A new idea for the floodlighting of football grounds was put into practice earlier this month at the Easter Rd ground, Edinburgh, of Hibernian F.C. Miller and Stables Ltd., local electrical contractors, who designed and erected the installation, have given the name "Drenchlighting" to their system of mounting floodlights on 100 ft towers with inclined heads. They are acting on the theory that there is a better fusion of light when the beams from lamps intersect along a line parallel with the mounting plane of the light sources. At Easter Rd 30 G.E.C. floodlights with 1500 W lamps are mounted on each tower. The same company's lighting fittings have been installed in stands and elsewhere

Chancellor urged to cut P.T. on Space and Water Heaters

AT LAST week's meeting of the Yorkshire Electricity Consultative Council a resolution was accepted calling for a reduction in the rate of purchase tax on electric radiators and immersion heaters. The resolution came from the Huddersfield district and arose after consideration of the problem of pollution of the atmosphere. Such a reduction, it was contended, would provide an incentive for domestic consumers to use alternative means of space and water heating. The resolution will go to the Chancellor.

At the same meeting a sub-committee was appointed to review the Area's Standard Domestic Tariff and its effect on consumers' accounts. Tariffs in this Area have been much discussed in the past year. Among the questions to be considered is the position of cellar-heads, kitchens and sculleries as assessable under the tariff. The Board is to be asked to consider the provision of electricity in domestic premises which already have a supply of gas. This was deemed necessary because of the need to increase consumption.

OLD FARADIANS' DINNER

THIS year the Faraday House Old Students Association Dinner was held, as is customary, at the Savoy Hotel. In accordance with past practice, the President of the I.E.E. proposed the toast "Faraday House," a task in which Mr J. Eccles acquitted himself ably. Referring to the ever increasing complexity of technical subjects, he appealed to educationalists to simplify wherever possible and cited electrical units as a particular example where this could be applied. Dr Coode-Adams, Principal of the College, replied. Two senior officials of the B.E.A. were present, Mr A. N. Irens who proposed the toast to the "guests" and Mr A. R. Cooper who replied on their behalf. The whole evening was a great success which of course reflected on the able manner in which Mr E. L. Gethin, Chairman of the Old Students Association, had organised the proceedings.

NEW COMPETITION TO ENCOURAGE DESIGN OF ELECTRIC SIGNS

THE first competition in the design of electric signs is to be held in this country. It is being sponsored by the Electric Sign Manufacturers' Association who, announcing the contest last weekend, say that its main purpose is to foster an improvement in electric sign design techniques. At the same time, it is hoped to create a better appreciation of the value and importance of electric signs for identification and advertising purposes.

Three prizes, of £100, £50 and £25 are being offered by the Association for the best design of a sign submitted for a factory specially drawn for the competition by a well-known architect. The competition is open to all and at least one prize will be awarded to an amateur designer. Competitors may enter as many entries as they wish, but all entries must be received by E.S.M.A. before 31 Jan. next. Full details of rules and conditions of entry may be had from the Association. Judging will be by a panel of experts in the architectural, town planning and advertising professions, and prizes will be presented at the E.S.M.A. annual lunch next March.

Exhibition of Plastics for Display Signs

THE versatility of plastics for display, whether they be actual display pieces or signs, is well portrayed in an admirable exhibition open throughout this week at the Tea Centre in Lower Regent St, London. The exhibition is entitled "Plastics in Advertising and Display," and is being run by the Plastics Division of I.C.I. Main interest from the electrical point of view is of course the material's adaptability to lighting techniques, and the examples displayed show some attractive effects obtained. One example of the novel colour and lighting effects which have been achieved, is a collection of model fish in fluorescent "Perspex," illuminated by ultra-violet light. Neon lit box signs fabricated in opal "Perspex," inn signs, road and garage signs, illuminated display fittings, and complete lighted display stands, all have their place in the exhibition. Examples of the results attained by many electrical firms are included in the exhibition which was officially opened by Lt Col A. M. Wilkinson, on Monday. It closes on Saturday.

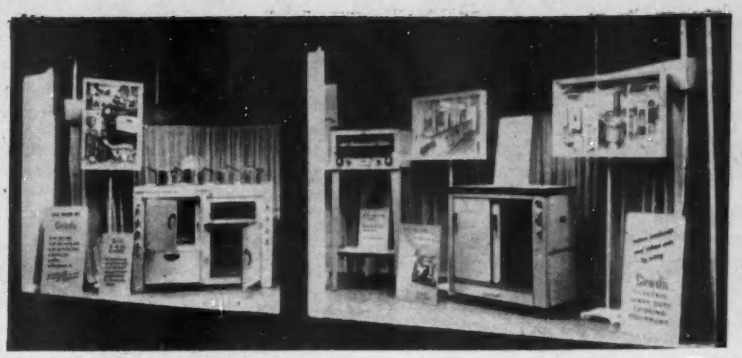
Ferranti — Power-Samas sign working agreement

IT is announced that Ferranti Ltd. and Power-Samas Accounting Machines Ltd. have arranged to work together on research, production and marketing of data processing equipment. This, of course, is of particular significance in connection with the development of electronic computation in commercial fields.

New Building for Packaging Research

EXPERIENCE during the war demonstrated the value of packaging. So often equipment received overseas was found to be useless due to high humidity, attack by insects or mishandling in transit. "P.I.P." was the symbol given to preservation, identification and packing, the key factors in the forms of packaging specified by the services. As a result of experience and research new concepts and techniques were introduced, hermetic sealing, rubber cushioning, bitumen paper lined protection all leading to the evolution of a new industry.

Export Packing Service Ltd., one of the specialist firms packing equipment for service and civilian requirements, attach such importance to the technical aspects of the subject that they have provided a Research and Development establishment, specially to solve packaging problems. This building, officially opened last week by Sir Edward Boyle, BART., M.P., provides initially 16,000 sq ft of which about a third is devoted to simulate all conditions met in service. Vibration and impact equipment is mounted on mass concrete blocks insulated with cork from the main building. For determining water resistance an immersion tank is available and a tropical chamber provides for high humidity tests. This test bay, together with the facilities for testing prototype packs, offers a new standard of applied research in the field so vital to our exports.



Display of heavy duty cooking equipment in the Harrogate showrooms of the N.E. Electricity Board during the British Hotel and Restaurants Association's conference. Window includes a Creda 6-16-60 Range, a Creda griller and Creda Hotcupboard made by Simplex Electric Co., Ltd.

Young Farmers prove Electricity is Best

RESULTS of the Young Farmers Competition organised by the S. Western Electricity Board were announced last week. This unique competition was arranged to encourage Young Farmers to carry out their own investigations into ways of achieving the most efficient use of labour, fuel and power so as to increase output and reduce costs. They were provided with plans and details of an imaginary farm. Teams from Young Farmers' Clubs from all parts of the Board's area participated. They visited farms to see some of the applications of electricity in its many aspects and judge the advantages over older methods.

At the presentation of awards last week, Mr S. F. Steward, the Board's chairman, said the results of investigations were really striking. They showed that increased output worth hundreds of pounds to the farmer, could be achieved by wise use of electrical appliances and equipment. The Board is doing its utmost to take electricity to the farming community which predominates in the Area, and it was now up to the farmers and all rural consumers to secure the greatest benefits which electricity provided, Mr. Steward said.

Winners of the competition were the Crewkerne Young Farmers' Club, Somerset, and the runners-up, in the order in which they were placed, were clubs from Woodbury (nr Exeter), Beaford (Devon), Bodmin (Cornwall), and Wells and Glastonbury (Somerset). The contest was conceived by Mr G. H. Johnstone, a member of the S. Western Board and vice-president of the National Federation of Young Farmers' Clubs.

Expansion in Telecommunications Industry

OVER £79 millions will be spent by the Post Office on telephone development next year—£11 millions more than this year and nearly double the sum spent in 1950, Earl De La Warr, the Postmaster-General, revealed at the dinner of the Telecommunications, Engineering and Manufacturing Association at the May Fair Hotel, last Thursday. During the last nine years 1,600 new exchanges had been opened and another 200 were under construction. In the overseas service, there were now nearly 460 connecting links with the continent, compared with 74 in 1945. Referring to research, he said P.O. engineers had ideas for an electronic switching system which might in time replace all mechanical systems in the telephone service. Electronic directors were already working experimentally in the Richmond Exchange. He also congratulated the Industry on its tremendous contribution to exports. In a characteristically blunt reply, Sir Thomas Spencer, chairman of Standard Telephones and Cables Ltd., (deputising for Sir Thomas Eades, of Automatic Telephone and Electric Co., who is abroad), called for a co-ordination of P.O. and industrial research and development facilities in order to apply the new discoveries and techniques. Speaking of the serious competition in overseas markets from foreign countries, particularly Germany, he called for action by the British Government.

The toast of "Our Guests" was proposed by Mr R. E. Robinson, immediate past chairman of the Association, to which the Rt Hon the Lord Luke, president of the London Chamber of Commerce, and Sir Hamish McLaren, director, Electrical Engineering, Admiralty, replied.

The First Half-Century

For the last half-dozen years various people have been trying to introduce electricity to agriculture, and in particular to apply it to mechanical ploughing. The latest attempt is that of the Societa Elettrotecnica of Turin. The advantage which the electric plough may be conceived to have over the steam plough is of the same character as that which the electric has over the cable tramcar—namely, the avoiding of the waste, loss and expense of a moving wire rope. This fact takes the interest out of the Turin experiments, since the plant there may be described as simply the Fowler two-engine system with electric motors substituted for the traction engines on the "headlands". A three-phase motor rated at 25 h.p. is stated to have been able to draw three 13 in. furrows at the rate of 42 yards a minute (which seems quick). The problem, however, is not one of engineering but of finance.—*From our issue of 27 October, 1904.*

MELTING FURNACES FOR INDIA

AN order for electric melting furnaces has been placed with the British firm Birlec Ltd. by Tata Locomotive and Engineering Co., Ltd., India. It is valued at about £115,000 and involves two 4-ton and two 7-ton capacity Lectromelt electric arc furnaces to produce high-grade iron and steel for use in new foundries at Jamshedpur. Delivery of the furnaces and ancillary electrical gear will be effected next summer.

Good Year for Trolleybuses

RESULTS of the transport undertakings operation during 1953-54 at South Shields emphasise once again the value of trolleybuses, and provide further evidence for those contemplating the scrapping of these vehicles. Trolleybuses in that locality showed a profit of £14,601 in the year to 31 Mar. last, as compared with the deficit of £10,313 recorded by motor buses. Net surplus on the joint undertaking amounted to £4,288.

International Standards for Refrigeration

THE Council of the British Refrigeration Association entertained members of a sub-commission of the International Institute of Refrigeration at the Park Lane Hotel, London, last week. The sub-commission comprises representatives of eight European countries and is at present studying existing codes for refrigeration plant with a view to drafting an International Safety Code. Last week, Mr R. H. Hemmings, chairman of the Association, spoke of the necessity for manufacturers' practical difficulties to be borne in mind when compiling codes and standards. A guest at the function was Mr H. A. R. Binney, of the B.S.I. He stressed the advantages of compiling standards voluntarily through consideration by all concerned. He also referred to the importance of the work of the International Standards Organisation in international trade.

£1m Building in Belfast for Technological Studies

NEW arrangements for higher technological studies, particularly in mechanical and electrical engineering are embodied in the Higher Technological Studies Bill, published in Belfast last week. At present university students of electrical engineering receive much of their tuition at the Municipal College of Technology, where courses leading to higher national certificates and similar awards are also provided. It is now proposed to transfer those activities to a new building which will be managed jointly by Queen's University and Belfast Corporation. The building and its initial equipment is expected to cost about £1m, which will be met largely out of capital grants voted to the university each year. It will be built and equipped by the university and then leased at a nominal rent to the Joint Authority, equally representing the two parties. This Authority will provide facilities for instruction but will not employ teaching staff, arrange courses nor examinations. These functions will be carried out by both parties, each for their own students.

Pembrokeshire's First Technical Institute

FIRST stage in the building of Pembrokeshire's first technical institute has started, with the laying of the foundation stone last week. It is situated at Neyland and the full scheme is expected to cost about £139,600. The first section will comprise two class rooms, a science laboratory and five workshops for bricklaying and plumbing, plastering, woodwork, engineering and electrical work.

Sayings OF THE WEEK

"By 1970 we must be able to produce, from atomic energy, the electric power equivalent of 20 million tons of coal a year. It is not a matter of whether it can or cannot be done. It's just got to be done." . . . DR T. E. ALLIBONE, speaking in New York.

"An industry criticised by the (Monopolies) Commission appears to have no effective appeal or challenge to the evidence on which the Commission has based its conclusions. An appeal to the President of the Board of Trade is ineffective after the damage has been done in the public mind." . . . W. TUDOR DAVIES, writing to the Daily Telegraph.

"Despite foreign competition this year we have so far managed to maintain our position and retain one-fifth of world trade . . ." SIR ERIC CARPENTER, president of the Association of British Chambers of Commerce, speaking at Grimsby.

NEWS IN BRIEF

Series of six lectures organised by the Royal Institute of Public Administration, on "Public Administration and the Law," begins on 8 Nov. at the Institution of Civil Engineers, Great George St, S.W.1.

Informal talk on Electric Water Heating was given to S.E. Electricity Board staff last Tuesday by Mr J. F. Ford, sales director of Santon Ltd.

U.K. Atomic Energy Authority are assuming direct responsibility for building, civil, mechanical and electrical engineering work now being carried out by the Ministry of Works, as part of the capital construction programme controlled from the Authority's Industrial Group H.Q. at Risley.

Minister of State for Colonial Affairs, the Rt Hon H. L. d'A. Hopkinson, was principal guest at the annual dinner of the B.T.H. Overseas Association at Rugby recently.

Shrewsbury Radio, Television and Electrical Exhibition was held at the Music Hall between 18 and 22 Oct. Accent of the show was on television, strongly supported by radio, but all exhibitors displayed a range of domestic appliances. There were demonstrations of washing machines and dry shavers.

Dimplex Ltd. recently held two sales conferences in London, attended by members of Electricity Boards and representatives of some big stores.

The Duke of Rutland and Rt Hon the Lord Balfour, of Inchrye, will be among guests of honour at the first annual dinner of the Institute of General Managers, to be held at the Savoy Hotel, on 3 Dec.

"Come back Peter"

The comedy of the above title, presented by the G.E.C. Dramatic Society at the Fortune Theatre this week, is a fair reflection of present-day times. It concerns the Hapgoods who, after moving from Streatham to a humble country bungalow, are swamped by their returning grown-up family with their respective husbands, wives and friends. The resulting scenes provided some hilarious comedy, thoroughly enjoyed by the audience. As Mary and William Hapgood (who has retired), Paula Kirkby and William Bulline admirably played their vital parts around whom much of the action revolved. Joan Morrison, as Dandy, and Veronica Farrier, as Myra, successfully handled their difficult parts, while Frederick James, as Charlie Hobson, the "sponging" friend gained many laughs. In fact, the performances of all are well worthy of commendation in this, the Silver Jubilee year of the G.E.C. Dramatic Society.

QUESTIONS IN PARLIAMENT

U.S. Contracts

ON Thursday Mr P. Thorneycroft (President of the Board of Trade) was asked about representations made to the United States Government concerning the grant of contracts for the Chief Joseph and Dallas Dams. These contracts went to U.S. firms despite tenders at lower prices by the English Electric Co. In his reply Mr Thorneycroft said that the U.S. Government had confirmed that the English Electric bids were the lowest which complied fully with technical requirements, but had stated that, after weighing all the factors involved, the bid of the American firm was not considered unreasonable under the provisions of the "Buy American Act." He agreed with his questioner that the reply was an exceedingly disappointing result to our representations, and said he felt that the Americans had fallen below the level of events. Various statements had been made about reform of the "Buy American Act" and about an interim executive order which would put the matter on a fairer trade basis from the British point of view. He hoped that some action more in keeping with the American position as a great trading nation would be taken.

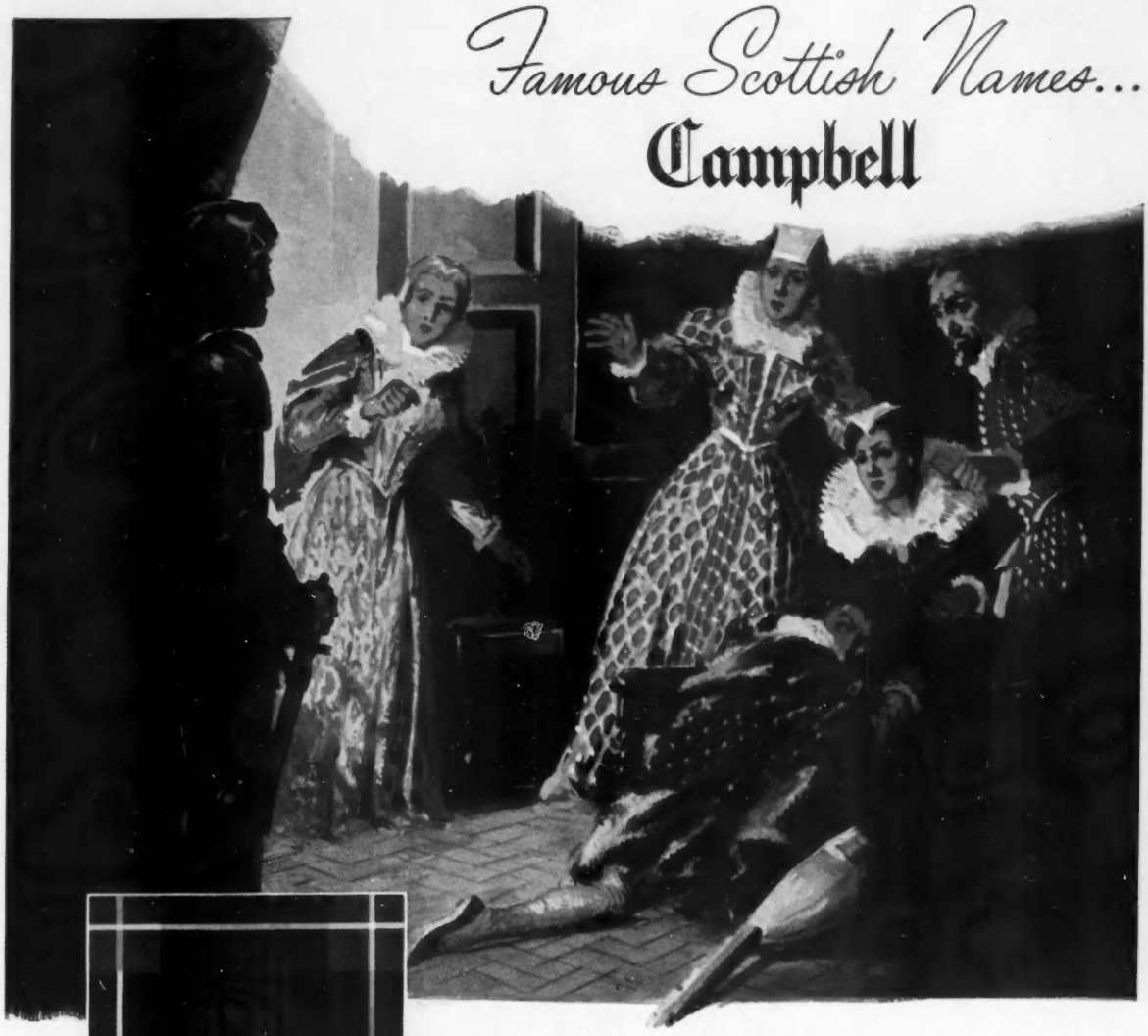
Replying to another question concerning a transformer contract for a hydro-electric project in Arizona he said that on final evaluation the bid was not the lowest foreign bid.

Supply Industry Workshops

IN A written reply, Mr L. W. Joynson-Hicks said the Minister of Fuel and Power refused to give a general direction to the B.E.A. to abstain from establishing its own central workshops. He said that experience showed that costs could be reduced and delays avoided by providing

Famous Scottish Names...

Campbell



On March 9th, 1566, a Campbell, the Countess of Argyll, was supping with Queen Mary at Holyrood when David Rizzio, the Queen's Italian Secretary, was murdered. The conspirators took possession of the Palace and Darnley, the Queen's husband, went to his wife's apartment. In a few minutes Lord Ruthven, in complete armour, strode into the room and demanded Rizzio. The latter implored the Queen to save him, but Ruthven thrust Mary into Darnley's arms while Rizzio was dragged out by armed men and stabbed to death.

Since the days of Sir Colin of Lochow, knighted in 1280, the *Cailean Mòr* from whom the Chief gets his patronymic of *MacCailean Mór*, the Clan Campbell has exerted a powerful influence on the fortunes of Scotland. It was a Campbell, the Earl of Argyll, who fought for Queen Mary at the Battle of Langside while his brother supported the young King. A Duke of Argyll commanded George I's army at Sheriffmuir, and also figured in Sir Walter Scott's *Heart of Midlothian* as the Minister to whom Jeanie Deans appealed.

Mottoes:
Above escutcheon
"*Ne obliviscaris*" (*Do not forget*)
Below escutcheon
"*Vix ea nostro voco*" (*I scarcely call all this mine own*)

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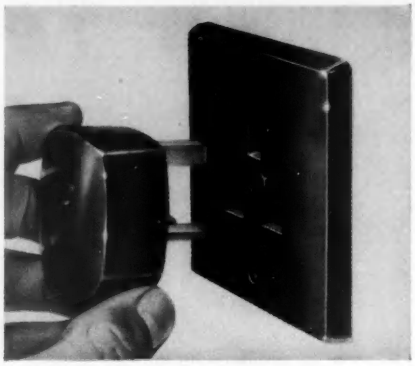
Plug in to lasting quality and switch to lower prices

Look what you get in MEM fused plugs and sockets to B.S. 1363. Extra safety for one thing—a shutter that will open only when all three pins are inserted together. Extra long life for another—the socket base is porcelain and definitely non-tracking. Then there's extra convenience for the wireman—the plug terminals are arranged so that all three leads can be cut to the same length. You'd choose them for quality alone. But like every MEM product, they are offered at very attractive prices.



Fit MEM plugs and sockets at every point

MEM sockets are made in switched and unswitched types for surface and flush mounting. They are available in brown or ivory white finish. Choose them throughout for domestic and commercial wiring. It means a tip-top job at lowest cost.

MEM

Switch, fuse and motor control gear, electric fires and localised lighting equipment

Send for List No. 341 and see for yourself.

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groups of power stations with a service from central workshops.

Oil-Burning Power Stations

FURTHER announcements on the policy of the B.E.A. with regard to oil burning were made by the Minister of Fuel and Power during the debate on the N.C.B. on Monday. He said that the Authority had decided to equip seven new stations with dual-firing equipment. For these, between two and three million tons of oil would be made available on a coal parity basis, i.e., a price that would make the cost of generation the same as with coal. Marchwood power station, the first of such stations, should be burning oil by the autumn of next year, and if all went well, the other stations should follow in the autumn of 1956.

Mr Lloyd also described a scheme which was under investigation, for bringing liquified natural gas in refrigerated tankers from the Middle East oil fields, where it was running to waste, and use it for this country's gas industry.

New Scottish Board

A REQUEST by the E.A.W. that the women consumers' point of view should be represented on the new South of Scotland Electricity Board by a woman member, was put in the House by Mr G. M. Thomson. He was told by Mr J. Stuart that such a request had been received and would be considered in the event of the Electricity Reorganisation (Scotland) Bill becoming law. No other general representations had been received concerning the Board.

Battery Locos in Highlands

PROGRESS report on the possibility of using battery-run locomotives on Scottish railways was sought by Mr Hector Hughes. The Secretary of State for Scotland said he was not involved in discussions which were proceeding between the N. of Scotland Hydro-electric Board and the British Transport Commission. It was for the Board to look after the electric power and for the Commission to take care of transport, and they were in consultation.

Cross-Channel Cable

REPLYING to Mr E. L. Mallalieu last week, Mr D. Gammans said he had not had any consultations with the French telephone authorities about the possibility of constructing a gallery under the Channel for telephone and electric cables.

Mobile Radio

NO decision has yet been reached concerning the choice of wave lengths for ambulance services equipped with radio which are at present operating in the television band. Mr D. Gammans, in a written answer, reminded Mr C. Alport that a committee had been set up to examine the problem. The committee fully appreciated the urgency and importance of the problem but had not as yet completed their enquiries, he said.

ELECTRIC SUPPLY NEWS

Brighton

The Corporation Housing Committee, with the concurrence of the Finance Committee, has recommended acceptance of the offer of the South Eastern Electricity Board to sell electrical installations and 17 wash boilers in certain corporation premises. These comprise 814 wiring installations for cooker and wash boiler points each with cooker control panel, and 3-heat control switch for wash boilers for which a charge of 2d. per week each is being paid to the Board; 185 wiring installations for cooker only complete with control panel, charged at 1d. per week, and 7 cooker control panels charged at ½d. per week. The Housing Committee reports that the installations had been repaired free of charge by the Board, and approximately £6,000 had been paid to date in hiring charges under the scheme commenced in 1934 by the Corporation Electricity Undertaking. It was considered it would be to the Corporation's advantage to purchase the installations outright, and the Board quoted the price of £1,000 for them plus £34 for seventeen wash boilers for which the Corporation were paying a rental of 4d. per week each.

Crawley

Complaints about interference with radio reception caused by fluorescent street lighting in the New Town have been taken up with the Postmaster-General by the local M.P. The P.M.G. has stated that about 300 lighting standards are concerned in the trouble. Twenty standards have been fitted with P.O. type suppressors, with success, and the Development Corporation is endeavouring to press the lighting firm to fit suitable suppressors to the other lamps. He explained that one of the difficulties had been that the radio noise has to be reduced to a very low level because the indoor aerial systems built into the adjacent houses were a little more susceptible to interference being conveyed by the underground electricity mains.

Doncaster

The Rural Council is objecting to proposals of the Yorkshire Electricity Board for providing a supply to the Council's new housing estates. The Board has asked that there should be adequate wiring to enable the tenants to make full use of an electrical service and so increase the average revenue per consumer. Alternatively the Board would either require a capital grant towards the costs involved, or a guarantee in respect of each estate which would make the scheme an economic proposition. The Housing and Town Planning Committee has suggested that the matter be taken up with the Ministry of Housing and Local Government.

Lancashire

The proposed siting of pylons for the B.E.A.'s 275 kV line to the west side of Bolton, concerning which a public inquiry opens next week, has aroused much local controversy, it seems. The Lancashire branch of the C.P.R.E., by suggesting an alternative route through country which they considered not to be of high scenic importance, has been the target of criticism. Lt Col D. A. S. Houghton, the branch chairman, has explained that in selecting an alternative the Council's job had been made more difficult because some of its subscribers would inevitably suffer, But the pylons had apparently to be erected somewhere. "If we lose a few subscribers then that is just unfortunate," he said. "We would like local authorities to view this broadly, and not merely seek to keep their own particular area unspoiled and dump the mess somewhere else."

Surrey

Possible routes for the B.E.A.'s 275 kV transmission line from West Weybridge, Surrey, to Northfleet, Kent, are to be studied by a joint committee of the Association of Surrey Amenity Societies and the Kent Committee of the Council for the Preservation of Rural England. Construction of this section of the 275 kV line has not yet been authorised, but apparently this new committee has been formed meantime to ascertain how the line can be placed with the minimum loss of amenities. If the Committee's early formation also assists in dealing expeditiously with the various objections raised, it will no doubt, be appreciated by the B.E.A.

LIGHTING SCHEMES

Bromley (Kent). The Council plans to spend £59,000 during the next financial year on improving street lighting.

Grantham. T.C. has decided on the conversion of all gas street lighting to electricity.

Gravesend. T.C. is applying for consent to borrow £24,476 for improved street lighting in the town over a period of three years.

Lanarkshire. The C.C. is to spend £11,000 on providing street lighting at eight new housing estates.

Reading. The Housing Committee has recommended that the borough engineer should arrange for street lighting on the Home Farm estate, at a cost of £1,080.

Salford. Schemes for improved street lighting, costing £31,547, are being proposed. These include the provision of sodium vapour lamps on main roads.

Scunthorpe. T.C. to carry out major street lighting improvements in Ashby Rd, Church Lane, Cemetery Rd, Cliff Gardens and Rowland Rd, at a cost of £9,671.

COMPANY ACTIVITIES

AFTER a somewhat "sticky" period Electric and Musical Industries is fighting back. After difficulties in 1952/53 caused mainly by the cost of introducing long-playing records, the decline in overseas sales due to import restrictions, and losses of orders from some of the overseas countries, the latest results show a good recovery. The directors encourage shareholders by putting up the dividend 2% to 10% which is also half-way between the best and worst of recent years.

Worth mentioning is Crabtree Electrical which has made the first dividend increase since the company was registered in 1936. Payment goes up from 17½% to 20%. This is not a mighty move but still a step in the right direction. The group trading profit is £47,000 higher at £294,000 and after increased tax and other charges, the higher dividend is covered over 1¼ times. The improvement is due to the company's development of new products about which the chairman should be able to give more information at the annual meeting.

The future of British Relay Wireless and Television seems well assured. The equity is what is known on the Stock Exchange as a typical "growth" stock, which means that as far as can be reasonably ascertained, the company's activities and perhaps profits are bound to increase steadily. Since the close of the financial year at April 30 last, two new combined sound and television relay systems have been inaugurated, one in Huddersfield and one in South-East London. Wisely, Sir Robert Renwick tells shareholders, there is to be no hurried programme of development. The future is to be built up without impairing current earnings.

A small retort to Mr Butler's recent suggestion that company directors might be distributing more than they should, at the expense of providing new equipment and modernisation, is made in the annual statement by Mr J. D. Sheridan, chairman and joint managing director of Strand Electric Holdings. This company has paid a dividend twice over. For last year, trading profit climbed to a peak of £299,000 against £265,000. Yet the board still holds its horses. On figures supplied, Mr Sheridan makes it clear that the Chancellor should look to his own nest first. He shows that whereas on the average Strand Electric ploughed back 22% during the past three years, and dividends took about the same, taxation took about 55% of profits.—*From our City Correspondent.*

Bullers Ltd.

The company's turnover was maintained during the year recently ended, but rising costs and keener competition have reduced the profits, continuing the slight reduction over the past few years, it will be seen from our table. The

Year to 31 July	£ Trading Profit	£ Net Profit	% on Ord. Earned	% on Ord. Paid	Ord. Price High	Ord. Price Low
1950	367,137	151,106	171	15	27/6	24/10½
1951	365,689	138,167	180	15*	30/8	25/–
1952	307,975	112,265	83	15†	25/6	24/1
1953	232,745	89,102	62	15	26/9	24/6
1954	194,193	62,005	42	15	26/3	23/6

*Plus 28% capital bonus.
†Plus 25% capital bonus.

balance sheet shows current assets totalling £999,343, and liabilities of £194,341. Stock and work in progress is listed at £323,371 (*£404,530*).

Crabtree Electrical Industries Ltd.

A final dividend of 12½% raises the total distribution by 2½% to 20%. Consolidated trading profit for the year ending 31 July last is £294,454, compared with £247,519 a year ago. The net profit amounts to £93,879 (*£65,601*). A tax free dividend of £70,000 (*£40,000*) has been received by the company from its subsidiaries.

Contactor Switchgear Ltd.

There is a final dividend of 15% making a total of 22½% for the year ended 31 July last. This is in accordance with the forecast made when the shares were introduced on the London and Birmingham Stock Exchanges last Dec. The directors also propose a one-for-three scrip issue, by the capitalisation of £50,000 from reserves. Trading profit for the year just ended is £124,889 compared with £111,189 for the previous year. The net profit figures are £48,942 and £35,864 respectively.

Dorman Smith Holdings Ltd.

For the year ended 31 Mar. last the profit is £67,590, compared with £78,997 for the previous year. The net profit figures are £20,088 and £22,486 respectively. The Ordinary dividend is again 4½%. The main cause of the fall in profits is due to losses sustained in South Africa, Mr T. Atherton, the chairman, explains. The company would have had a record year had it not been for the commitments in that country, he adds. During the year, the company acquired the issued capital of the Oldfield Engineering Co., whose workshop is near the company's Ordsal works.

Electric and Musical Industries Ltd.

Trading profit for the year ended 30 June last is £1,387,682 compared with £660,039 a year earlier. The dividend is raised by 2% to 10%. The net profit amounts to £457,170 (*£279,983*) of which £248,960 (*£242,798*) is applicable to the parent company.

Garrard Engrg. and Manfg. Co. Ltd.

Treasury consent has been received for the issue of 1,613,536 1s. Ordinary shares, which it is intended to offer for subscription in cash at 4s. each to Ordinary shareholders. On completion of the issue, it is proposed to make an issue to Ordinaryf holders of 7,260,912 1s. Ordinary shares by way of capitalisation of £363,045. 12s. of reserves.

Jerusalem Electric and P.S. Corporation Ltd.

The directors report that an offer has been received from the Palestine Electric Corporation Ltd., to acquire all the issued Preference and Ordinary shares of I£1 each in exchange for fully paid 4½% Second Redeemable Cumulative Preference shares of £1 sterling. The Jerusalem company has entered into a contract with Power Securities Corporation Ltd. for the sale to them of the whole of the assets of the Corporation situate in Jordan. Power Securities Corporation Ltd. state that it is intended to register a new company in Jordan to operate the undertaking.

Strand Electric Holdings Ltd.

Records in turnover and gross trading profit resulted from expansion of the business in year ended 31 April. Mr J. D. H. Sheridan, the chairman, adds that a new subsidiary has been acquired which it is hoped will open up new fields

Year to 30 Apr.	£ Trading Profit	£ Net Profit	% on Ord. Earned	% on Ord. Paid	Ord. Price High	Ord. Price Low
1951	275,140	22,214	37	17½	10/3	8/2
1952	294,965	22,927	38	17½	9/–	7/6
1953	268,546	17,291	27	17½	10/–	7/7
1954	302,256	23,972	40	17½	9/6	8/1

in the electrical contracting activities. Overseas, steady progress is being made and engineers have, for the first time, installed equipment in South America.

Venner Ltd.

The directors announce a funding into Loan stock of temporary borrowings by which the expansion of the business has been financed. The issue is to be of £200,000 5½% Unsecured Loan stock, 1963-67. The proceeds will be applied in repaying the bank overdraft.

Dividends Declared

Bakelite Ltd. Interim of 5% (*3%*), but the increase is intended to reduce the disparity between the interim and final dividends.

Barton and Sons. Interim 5% (*same*).

British Electric Traction. Interim of 7½%.

East African Power and Lighting Co. Interim of 3% (*same*).

Ever Ready Co. (Great Britain) Ltd. Interim of 10% (*15%*) on capital increased by 50% scrip issue.

Ever Ready Trust. Interim of 6% (*same*).

Glenfield and Kennedy Holdings. Interim of 5% (*same*).

Hopkinsons Ltd. Interim of 10% (7½%).

COMMERCIAL INFORMATION

Contracts Open at Home . . .

Dates given are the final for receipt of tenders unless otherwise stated.

29 Oct.—Donegal C.C. Installation in new district hospital, Carndonagh.—See 30 Sept. issue.

29 Oct.—Dublin T.C. Test instruments for public lighting dept.—See 14 Oct. issue.

29 Oct.—Kirkcaldy T.C. Electrical work in 150 houses.—See 30 Sept. issue.

29 Oct.—Liverpool T.C. Installation at Westminster Rd primary school.—See 14 Oct. issue.

29 Oct.—Llandudno U.D.C. Concrete lighting columns with lanterns.—Advertised in 7 Oct. issue.

29 Oct.—Manchester T.C. Installation in 19 houses at Crumpsall, Withington and Longsight.—Advertised in 21 Oct issue.

29 Oct.—Maybole T.C. 52 lighting points on route A77.—See 7 Oct. issue.

29 Oct.—Oswaldwistle U.D.C. Installation in 32 dwellings on White Ash Estate. —See 16 Sept. issue.

30 Oct.—Adwick-le-Street U.D.C. Supply of equipment for sodium discharge lighting on Great North Rd A.1.—Advertised in 7 Oct. issue.

30 Oct.—Peterborough T.C. Installations in 138 houses on Walton estate.—Advertised in 21 Oct. issue.

30 Oct.—Portadown T.C. Flashing beacon units for pedestrian crossings. —See 21 Oct issue.

30 Oct.—Swansea T.C. Supply of sodium public lighting equipment.—Advertised in 14 Oct. issue.

30 Oct.—Thornaby-on-Tees T.C. Installation in 86 houses on Gilpin Brown estate. —See 21 Oct. issue.

1 Nov.—Argyll. Electrical installation at maternity hospital, Glenenchar, Oban. Names to C. G. Macechern, secretary, "Aros," Lochgilphead, Argyll.

1 Nov.—Brighton T.C. Two electrically-driven pumps, control gear valves, recording instruments at Lewes Rd pumping station.—See 14 Oct. issue.

1 Nov.—Dudley T.C. Provision and laying of 4-core street lighting cable about ¼ mile along A.4123. Apply by above date to Borough Engineer, The Council Hse. Priory Rd. Deposit £5. 5s.

1 Nov.—Edinburgh T.C. Installation in Parks Dept. Offices in Cranston St.—See 21 Oct. issue.

1 Nov.—Isle of Wight. Wiring of Council houses at Dodpits, Shalfleet, and Langbridge, Newchurch.—See 21 Oct. issue.

2 Nov.—Fleetwood T.C. Electrical work in 48 houses on West View estate. —See 14 Oct. issue.

3 Nov.—N. Ireland. Lighting and power installations, luminous cell and radio diffusion systems at Mourne Hospital, Kilkeel.—See 21 Oct. issue.

4 Nov.—Belfast T.C. Installation in Ballysillan intermediate school.—See 14 Oct. issue.

4 Nov.—Bingley U.D.C. Class B concrete columns and lamps etc.—See 21 Oct. issue.

4 Nov.—Manchester T.C. Supply of Class A steel or concrete street lighting columns. City Surveyor, Town Hall.

4 Nov.—Pontardawe R.D.C. Supply and erection of 12 columns and lanterns within Gwauncaegurwen and Ystalyfera. Also supply only of 45 lanterns and brackets for sodium vapour discharge street lighting schemes. Engineer and Surveyor to Council, Council Offices. Deposit £2. 2s.

4 Nov.—Northumberland. Lighting at Blyth, Plessey Rd C.P. school. Names by above date to County Architect, County Hall, Newcastle.

4 Nov.—Preston T.C. Installation at Eldon St primary school.—See 21 Oct. issue.

4 Nov.—Twickenham T.C. Street lighting units for stage 1 of Group A scheme in Hampton Area.—See 14 Oct. issue.

4 Nov.—Warrington T.C. Fluorescent lighting and wiring at general market. Borough Surveyor, Town Hall.

5 Nov.—Belfast T.C. Electric hoist-block and 12 in. bore parallel slide valve for steam plant.—Advertised in 14 Oct. issue.

5 Nov.—Bradford. Lamps during 1955 for hospitals in Bradford A Hospital Management Group.—See 21 Oct. issue.

5 Nov.—N. Ireland. Installation in Gardenmore Presbyterian Church, Larne.—See 7 Oct. issue.

5 Nov.—Westhoughton U.D.C. Street lighting in Newbrook Rd, (A.579).—See 21 Oct. issue.

5 Nov.—Wrexham T.C. Columns, lanterns, lamps and time-switches for Group A and B street lighting. Advertised in 14 Oct. issue.

6 Nov.—Ashton-in-Makerfield U.D.C. Street lighting equipment for schemes in Birch Grove and Leyland Green Rd, and on Landgate Lane estate. Surveyor, Town Hall.

6 Nov.—Dublin. T.C. Supply of circuit-breakers and condensers for public lighting dept. Finance Dept, City Hall.

6 Nov.—Durham. Electrical installation at following schools: Annfield Plain modern, Seaham Harbour, Deneside county, Sedgefield county, Trindon Grange county, and Washington Biddick county. Names by above date to G. R. Clayton, county architect, Court Lane.

6 Nov—Manchester T.C. Supply of electrical equipment for extension to Municipal College of Technology. Registrar, College of Technology, Manchester.

6 Nov.—Windsor T.C. Lamps, fittings and cable during 1955.—See 14 Oct. issue.

8 Nov.—Aldridge (Staffs.) U.D.C.—Group A street lighting units along Birmingham Rd. (A.34).—See 21 Oct. issue.

8 Nov.—Banstead (Sur.) T.C. Concrete columns and lanterns for joint housing scheme of three boroughs.—See 21 Oct. issue.

10 Nov.—Inverness T.C. Electrical work in 26 houses in Diriebught Rd. Burgh Architect, J. Blackburn, 11 High St.

11 Nov.—Dagenham T.C. Supply and installation of power factor correction equipment at Riverside Sewage Works, Rainham. Borough Engineer and Surveyor, Civic Centre.

13 Nov.—E. Lothian. Electrical work in reconstruction of Clark Buildings, Ormiston. Property and Works Dept., County Buildings, Haddington.

15 Nov.—Dublin T.C. Electrical installation in new Technical School for Boys in Collins Ave. Sean Mulcahy, consulting engineer, 70 Merrion Sq. Deposit £5. 5s.

15 Nov.—Edinburgh. Electrical maintenance work at five institutions during 1955 for Royal Victoria and Assoc. Hospitals' Board. A. G. Welstead, secretary, County Hospital, Green Bank Drive. Deposit 10s.

15 Nov.—Southampton T.C. Rewiring at Regent's Park secondary girls, Mount Pleasant, and Northam junior mixed schools. Apply to Borough Architect, Civic Centre, by 1 Nov. Deposit £5 in each of the three cases.—Advertised in this issue.

16 Nov.—Carmarthenshire. Alterations to electrical installation at Gelli Aur Farm Inst. Names by 30 Oct to W. T. Lloyd, country architect, County Hall, Carmarthen.

Your Queries Answered

Readers are invited to make use of our free enquiry department which possesses wide resources including an index of trade information with over 100,000 entries

A Selection from the 129 queries answered this week

"Difulite" louvre lighting system, makers of? B.C.—Metal Sections Ltd., Oldbury, Birmingham.

V. and N. Hartley Ltd., makers of lighting fittings, address of? S.W.B.—Wellington Mills, Greenfield, nr. Oldham.

"Lithotex" lithographing machines, address for? T.L.—Pictoria' Machinery Ltd., Lithotex Building, Kelvin Way, Manor Royal, Crawley.

"Nulux" irons, makers of? E.E.B.—T. Price and Son (Stampers) Ltd., Spring Hill Passage, Birmingham 18.

Spring-loaded cable drums, makers of? S.E.B.—Deco Eng. Co., Ltd., Deco Works, West Row, W.10; Sturge and Co., Ltd., Sheepcote St, Birmingham; Power House Components Ltd., Albion Chambers, King St, Nottingham; Metropolitan Tool and Products Ltd., 21 Victoria St, Nottingham.

Very small ice-cube making refrigerators as a standard item, makers of? B.E.—Kubeice Ltd., 39 New Oxford St, W.C.1.

"F. and G." terminal blocks, makers of? W.W.C.—Fraser and Glass Ltd., Woodside Lane, N.12.

16 Nov.—Hazel Grove and Bramhall U.D.C. Concrete and steel columns, lanterns, etc., along Buxton and Macclesfield Rds.—Advertised in 14 Oct. issue.

16 Nov.—Lichfield T.C. Supply and installation of steel columns, brackets, sodium and fluorescent lanterns for Group A lighting along A.51. City Engineer and Surveyor, D. Oglesby, Guildhall. Deposit £2. 2s.—Advertised in this issue.

17 Nov.—Kincardine. Street lighting for Silverbank estate.—See 21 Oct. issue.

18 Nov.—Belfast T.C. Extensions to pneumatic dust removal and surface installation at Power Station West.—Advertised in 14 Oct. issue.

22 Nov.—Southampton T.C. Electrical installation at Technical College (reconstruction, stage 5). Apply to Borough Architect, Civic Centre, by 5 Nov. Deposit £5.—Advertised in this issue.

24 Nov.—Co. Down. Electrical services at Donaghadee intermediate school. A. N. Irens, consulting engineer, 58 Howard St, Belfast. Deposit £3. 3s.

24 Nov.—Littlehampton U.D.C. Installation in 12 houses on Wickbourne estate.—See 21 Oct. issue.

30 Nov.—Tottenham B.C. Lamps wanted in year from 1 Apr.—See 14 Oct. issue.

No date stated.—Southport T.C. Class B street lighting conversions.—See 21 Oct. issue.

. . . and Overseas

*Details of items marked * may be obtained on application to the Board of Trade, Lacon House, Theobalds Rd, W.C.1, quoting reference.*

15 Nov.—Iraq. Supply of five 100 kVA and five 200 kVA transformers step-down, 3-phase, 50 c/s at ·9 power factor, oil immersed, naturally cooled, double wound, core type, for outdoor service. Directorate General of Municipalities, Baghdad. B.o.T. (Ref.: ESB 24539/54).*

17 Nov.—South Africa. Supply of automatic exchange 50 line (PAX unit) with transrector unit and batteries. Specif. No. CEE/DR/TEL/F/1. Tender No. C8412. Stores Dept., S. African Railways. B.o.T. (Ref.: ESB 24672/54).*

18 Nov.—New Zealand. Following required by Stores Div., G.P.O., Wellington: uninsulated alligator and battery clips, conduit, saddles, connectors, terminal blocks, watertight fittings for lamps, plugs, ceiling roses, sockets and switches. Ref.: P. and T. 150/7368. B.o.T. (Ref.:ESB 24045/54).*

23 Nov.—India. Supply of four 75 kW four 250 kW and four 150 kW diesel generating sets with accessories and control panels for four proposed pilot power stations in North Bihar. Superintending Engineer, Central Technical Circle, Electricity Dept., Patna. Fee Rs. 5.

25 Nov.—Pakistan. Supply of (*a*) one 250 MVA interrupting capacity double busbar compound-filled 11 kV switchboard remote control comprising 26 panels; (*b*) one 11 kV control board for above; and (*c*) spares for above. Dept. of Supply and Development, Government of Pakistan, Frere Rd, Karachi. B.o.T. (Ref.: ESB 24096/54).*

25 Nov.—S. Rhodesia. Supply of one loading resistor for load-testing the generators of English Electric 2,000 h.p. diesel-electric locomotives. Rhodesia Railways, P.O Box 603, Bulawayo. B.o.T. (Ref.: ESB 24480/54).*

PRICES of cable metals and other materials

Figures quoted are the official prices ruling on Tuesday, 26 October

	£ per ton	Weekly change £	Price last year £
COPPER, standard class A (settlement)	282½	+3½	242½
„ (3 months)	262	+5	225½
LEAD, refined pig, min. 99·97% purity (cash)	111	+3¾	96¾
„ (3 months)	103	+1	90¾
TIN, refined, min. 99·75% purity (settlement)	730	−1	627½
„ (3 months)	728	−4	606½
ALUMINIUM, ingots 99-99·5%	150	—	150
ZINC, virgin, min. 98% purity (cash)	81	−1	75¾
„ (3 months)	80¾	−1	72¾
RUBBER No. 1, RSS, spot (per lb.)	25d.	—	16¾d.-16¾d.
„ c.i.f. basis, ports, Dec. (per lb.)	23¾d.	+¾d.	16½d.-16½d.
ARMOURING:			
Galv. Steel Wire (0·104 in.)	52½	—	50½
Mild Steel Tape (0·014 in.)	40½	—	40

30 Nov.—U.S.A. Supply of turbine governing equipment with auxiliaries for 123,800 h.p. and 18,800 h.p. turbine units. District Engr., Corps of Engineers, U.S. Army, 628 Pittock Block, Portland 5, Oregon. Tender No. Civeng 35-026-55-64. B.o.T. (Ref.: ESB 24247/54).*

1 Dec.—India. Supply and erection of a 60,000 lb./hr steam boiler with stoker, superheater, economiser, accessories, etc., for Nellore Thermal station. K. P. Bhat, executive engineer, 20 Rutland Gate, Nungambakkam, Madras 6.

1 Dec.—Iraq. Central Foreign Purchasing Board require table model manual switchboards and telephone protectors. B.o.T. (Ref.: ESB 24613/54).*

2 Jan.—India. Supply of 3,000 V overhead equipment excluding structures for electrification of Howrah-Burdwan line including Tarakeshwar branch line. Engineer-in-Chief, Calcutta Electrification Project, Eastern Railway Bldg, 17 Netaji Subhas Rd, Calcutta. Deposit Rs. 30.

3 Jan.—Malaya. Supply and installation of four vertical electrically driven sewage pumps for Municipality of Kuala Lumpur. Documents from consulting engineers, J. D. and D. M. Watson, 18 Queen Anne's Gate, Westminster, S.W.1. Deposit £5. 5s.

3 Feb.—Australia. Turbo-alternator plant required by Electricity Trust of S. Australia for Port Augusta B power station. Two or 3 units required, 60 MW capacity (MCR), 900 p.s.i. 900° F steam conditions. Specifications available from Preece, Cardew and Rider, consulting engineers, 8 Queen Anne's Gate, Westminster, S.W.1.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, W.C.2.

Printed Circuits Ltd. 295 Regent St, W.1. Electrical engineers and contractors, electrical wiring contractors and specialists, etc. Nom. cap.: £100. Dirs.: P. Millett and L. Levens.

Glenbrook Industries Ltd. Electrical and mechanical engineers and contractors, etc. Nom. cap.: £500. R. H. Duthie, 29 Frithwood Ave, Northwood, Middx, signs as director. Sub.: J. L. Hughes, The Priory, Hervines Rd, Amersham, Bucks.

I. and G. Manufacturing Co., Ltd., 59 Sloane St, S.W.1. Manufacturers of and dealers in domestic, household, electrical, fancy goods and clothing of all kinds; automobile, mechanical, electrical and general engineers, etc. Nom. cap.: £1,000. Dirs.: D. R. Welch and L. C. Welch.

General Instruments Co., Ltd. 99 Fenchurch St, E.C.3. Manufacturers of and dealers in optical, mechanical, electrical, physical, chemical, mathematical and photographic instruments, etc. Nom. cap.: £3,000. Dirs.: J. Tadayon and R. L. T. Dibben.

Radio House (Exeter and Plymouth) Ltd. 94 Tavistock Rd, Plymouth, Devon. To take over business of wireless, television, motor and refrigeration engineers carried on as "Radio House" at 38/9 Sidwell St, Exeter. Nom. cap.: £4,500. Permanent dirs.: J. T. Howard and Lilian C. Howard.

C. J. and E. Reeves Ltd. 10a Mill St, Sutton Coldfield. Agency or agencies for the import, export, purchase, distribution and sale of electrical and pneumatic plant, machinery, etc. Nom. cap.: £1,000. Dirs.: C. J. Reeves and Ellen Reeves.

Boston Manor Appliance Co., Ltd. 129 Little Ealing Lane, Northfields, Middx. Electricians, electrical, electronic, radio and television engineers, etc. Nom. cap.: £2,000. Dirs.: C. W. T. Goodhew and E. B. Cachart.

F. Ar'iss and Co., Ltd. 47 Burns Way, Heston, Middx. Electrical engineers and contractors, etc. Nom. cap.: £100. Dirs.: F. Arliss, I. Feldman, and F. J. Kelsey.

John Senior and Co., (1954) Ltd. Manufacturers of and dealers in washing and similar machines and appliances, etc. Nom. cap.: £5,000. Dirs.: not named. Subs.: H. J. Barlow, Broadlands, Goldthorn Hill, Wolverhampton; and G. H. Budgens, 18 Vicar St, Wednesbury.

Contracts Placed

Dagenham T.C. Electrical installation in houses under contract, 1 on Marks Gate estate, Evans and Shea Ltd., £3,650; same under contract 2 on that estate, Edgar C. Porter Ltd., £1,638.

London. Installation in Memorial Wing of Victory Ex-Service's Club, F. W. Wheeler; same in John Rennie primary school, Stepney. Carlin Engineering Co. Ltd., £2,880.

Newcastle-on-Tyne. Installations in new villas at Prudhoe and Monkton Hospital, F. Reid Ferens and Co., Ltd., £3,099. Also lighting and power services in new psychiatric unit in General Hospital, Veale Nixon Ltd., £4,016.

BUSINESS PROSPECTS

Home

Ashby U.D.C. Start to be made soon on first 60 dwellings on Willesby Rd estate.

Aylesbury. £40,000 factory planned by W. Moorhouse and Sons Ltd. Architect is R. C. White, Temple Sq.

Barnstaple (Dev.) T.C. Ministry approved erection of 96 houses during 1955.

Bracknell (Berks). Factory to be built at new town for Lennie and Thorne, toolmakers of 8 Ormond Yard, London, S.W.1. Cost will be about £38,000.

Brampton (Hunts). Air Ministry to develop land and erect 171 houses.

Bristol. Coca-Cola Southern Bottlers Ltd., of London, W.4, to erect factory on Brislington estate.

Bromley T.C. Construction of 66 flats in Blyth Rd. Borough Engineer, Municipal Offices.

Cambridge T.C. Erection of six shops and 28 flats at Trumpington. City Surveyor, The Guildhall.

Carlisle T.C. Additions costing £40,000 to be carried out at county high school. Work will begin next year.

Cheam (Sur.). Provincial Sheet Metal Works Ltd, 299 Gander Green Lane, planning to erect new factory.

Croydon. Factory on New Addington estate proposed by Butcher Bros. Ltd, 1 Theobalds Rd.

Doncaster T.C. Martin primary school and secondary modern school are to be built at Intake. Council to approach Yorkshire Board to provide additional power points in council houses on new estates.

Durham. New divisional police headquarters to be built at Whickham but proposal still in early stages.

East Kilbride. D.S.I.R. understood to be about to proceed with third stage of mechanical engineering research laboratory.

Eire. Construction of primary school at Ursuline convent, Thurles. P. Mulcahy, Quantity Surveyor, 62 Merrion Sq, Dublin.

Enfield U.D.C. Erection of 24 flats and 66 houses on Manor Farm site. Also erection of 24 flats, branch library and community hall on Bullsmoor Lane estate. Engineer and Surveyor, F. Lee, 7 Little Pk Gardens.

Felling (Dur). Manchlen, Weightman and Elphick, 12 Saville Row, Newcastle-on-Tyne, are architects for showroom, offices, petrol filling station in Sunderland Rd for Grimshaw Leather and Co.

Fence Houses (Dur.). Funds being raised for new Y.M.C.A. premises costing about £37,000. Architects are S. W. Milburn and Partners, 9 Esplanade, Sunderland.

Glasgow. Olivetti Manufacturing Co. considering erection of new factory on Queenslie industrial estate.

Hambledon (Sur) R.D.C. Erection of 18 houses and four flats at Wonersh. Engineer and Surveyor, Council Offices, Bury Fields, Guildford.

Henley T.C. Tenders may soon be invited for installation of electricity in 67 houses and bungalows on Mount View estate.

Hornsey T.C. Provisional sketch plans prepared for Tollington Secondary grammar school.

Keswick U.D.C. Another 28 houses on Latrigg Close estate.

Liverpool. Further storey to be added to Vale Rd factory of Howard Ford Ltd. Architect is W. V. Hogarth, 9a North Drive, Sefton Park.

Long Eaton. New factory for manufacture of kitchen equipment planned by Wallis and Co (Long Eaton) Ltd.

Longridge U.D.C. Construction of 48 houses in Kestor Lane. Clerk of Council, Council Offices.

Markinch. New block of offices to be erected for J. Haig and Co., Ltd. Cost estimated at £115,000.

Morley T.C. Erection of 64 houses on Dean Hall estate, Asquith Ave, Housing Director, M. H. Brook, National Provincial Bank Chambers, Queen St.

Newcastle-on-Tyne. New works and offices to be built in Russell Terrace for Service Welding Co., Ltd. Architects are J. G. Cowe and Son, Central Chambers, Chester-le-Street.

Newton Aycliffe (Dur.). Development Corpn. received permission to erect 370 houses, 20 bungalows near Woodham Burn.

Northampton R.D.C. It is proposed to erect 278 houses in district next year.

Norwich. J. Mackintosh and Sons Ltd., Chapel Field East, to build 4-storey administrative block in Coburg St. Consulting engineers are F. S. Snow and Partners, P.O. Box No. 116, Monro Building, Wellington St, London, W.C.2.

North Riding. Erection of county primary school at Eastfield, Scarborough. F. Barraclough, County Hall, Northallerton.

Peterborough. Extensions and improvements at C. of E. school at Castor estimated to cost £12,000.

Paignton U.D.C. Erection of 60 flats and maisonnettes, and 10 shops and maisonnettes in one block. Clerk of Council, Municipal Offices, Oldway, Paignton.

Portland (Dorset). Admiralty planning to build 150 houses in Easton-Weston area.

Rawmarsh U.D.C. Erection of 50 houses and bungalows on Dale Rd estate. J. R. S. Creighton, Engineer and Surveyor, Council Offices, Parkgate. It is proposed to erect 100 houses at Tyzack's Hill.

Redcar T.C. Loan sanction for £134,968 sought for erection of 104 houses on Lakes estate.

Rochdale T.C. Construction of three blocks of shops and dwellings on Kirkholt estate. Borough Surveyor, Town Hall.

Scunthorpe T.C. Five blocks of 3-storey flats to be built on Lincoln Gardens estate at estimated cost of £91,521.

Sheffield T.C. Erection of county primary school at Bradway. J. L. Womersley, City Architect, Town Hall.

Sheffield T.C. Following appointments being considered of architects for Abbeydale grammar school for boys and Chaucer secondary school respectively. Taylor and Young, 195 Oxford Rd, Manchester; and Yorke, Rosenberg and Mardall, 2 Hyde Park Place, London, W.2.

Slough. Start expected to be made next spring on Aspro Ltd's new 30,000 sq. ft. factory.

Spennymoor U.D.C. Loan sanction for £132,848 sought for erection of 100 houses at Middlestone Moor. Architects are Gray and Partners, Camden St, North Shields.

Stalybridge T.C. Erection of 75 houses on Copley estate. Borough Engineer, Town Hall.

Stanley (Dur.). U.D.C. Loan sanction for £2,077 received for electrical installation in 210 houses.

Stockton-on-Tees T.C. Land off Fairfield Rd to be developed as housing site, Provision is made for 460 houses.

Thurso T.C. Plans in hand for erection of 200 houses for staff of Dounreay atomic energy station.

Walsall T.C. Hoare Lea and Partners, 23 St James Rd, Birmingham, will probably be electrical consultants for flats at Little Bloxwich South, Dudley's Fields and Burrowes St.

West Bromwich T.C. Ready Bros. (West Bromwich) Ltd., Izans Rd, propose to build factory and offices on site 3b, Brandon Way.

West Hartlepool T.C. New fire station being planned in district. It will cost about £52,000.

Overseas

Colombia. Further representation of U.K. manufacturers of electronic equipment, generating sets and alternators sought by Mr Edwards Gabrieloff, Calle 11, 1-22 Cali, Colombia.

Egypt. M. L. Franco and Co., S. Pinto and Co., Succrs., 26 Sh. Kasr el Nil, P.O. Bag, Cairo, wish to contact British manufacturers of ceiling fans and all kinds of electric fans.

Iraq. Faiha Trading Corpn., Mustansir St, Baghdad, would like to represent as soon as possible a U.K. manufacturer able to offer early delivery of electrical transformers.

Gazette Announcements

COMPANIES ACTS

H. G. Gornall and Co., Ltd. Liquidator, F. C. Ormrod, Official Receiver, 20 Byrom St, Manchester, released as from 14 Oct.

Denglow Ltd. Meetings of creditors and contributors will take place on 1 Nov. at Inveresk House, Strand, W.C.2, at 11.30 a.m. and 12 noon respectively.

Cox's Radio and Electrical Co., Ltd. Meetings of creditors to be held at Birmingham Chamber of Commerce, New St, Birmingham, on 8 Nov., at 12 noon.

BANKRUPTCY ACTS

Order on Application for Discharge

Great Grimsby. Montague John Hatton, electrical contractor trading as Hatton and Hanna at 128 Kingston Rd, New Malden, Surrey. Discharge granted, suspended for six months until 22 Mar., 1955. Order dated 22 Sept.

Orders Annulled, Rescinded, etc.

Peterborough. Robert V. Mayner, electrical engineer trading in Narrow St. and Wentworth St, Peterborough. Adjudication order dated 20 Apr., 1922, annulled, and Receiving order of same date rescinded as from 15 Oct., on grounds that debts paid in full together with 4% statutory interest.

MEETINGS TO NOTE

THURSDAY, 28 OCT.

INCORP. PLANT ENGRS. (Sheffield). "Boiler Feedwater Treatment for Industrial Problems." C. J. Carter. Grand Hotel, 7.30 p.m.

E.P.E.A. (S. Western). "Art of Public Speaking," Gordon Rankin. Electricity Hse, Colston Ave, Bristol. 7.15 p.m.

FRIDAY, 29 OCT.

I.E.E. (E. Midland). Kettering annual ball at George Hotel.

I.E.E. (N. Staffs). "Continuity of Electricity Supply," H. Leyburn. Elect. Showrooms, Stoke, 7 p.m.

I.E.E. (Southern). "Loudspeaker Systems —Recent Trends in Loudspeaker Design." Maj. A. E. Falkus. Tech. College, Weymouth, 6.30 p.m.

INSTN. OF MECHANICAL ENGINEERS. Parsons Memorial Lecture: "Factors Influencing Continuing Development of Steam Turbine." F. Dollin, 5.30 p.m.

MANCHESTER ASSOC. OF ENGRS. "Testing Lubricants for Prevention or Promotion of Wear," T. B. Lane, Engrs. Club, Albert Sq, 6.45 p.m.

E.P.E.A. (Southern). "Corrosion in Power Station," R. S. Thornhill. B.E.A. Headquarters, 111 High St, Portsmouth, 7.30 p.m.

MONDAY, 1 NOV.

I.E.E. (London Students). "Pumped Storage for Peak Load Power Supplies." C. D. Gardiner. Savoy Place, W.C.2, 6.30 p.m.

I.E.E. (Mersey and N. Wales). "Aluminium-Sheathed Cables." P. A. Raine and P. M. Hollingsworth. Liverpool Royal Instn., Colquitt St, 6.30 p.m.

I.E.E. (N.E. Radio and Measurements). "Submerged Telephone Repeaters for Shallow Water." R. J. Halsey and F. C. Wright. King's College, Newcastle, 6.15 p.m.

I.E.E. (S. Midland). "Possibilities of Cross-Channel Power Link between British and French Supply Systems," D. P. Sayers, M. E. Laborde, and F. J. Lane. James Watt Memorial Inst., Great Charles St, Birmingham, 6 p.m.

I.E.E. (Western). "Manchester - Kirk o'Shotts TV Radio-Relay Systems," G. Dawson, L. L. Hall, K. G. Hodgson, R. A. Meers and J. H. H. Merriman. S. Wales Inst. of Engineers, Park Place, Cardiff, 6 p.m.

I.E.E. (Ipswich). "Fluorescent Discharge-Tube Circuits and Operating Problems," J. Cates, Crown and Anchor Hotel, 6.30 p.m.

I.E.E. (Maidstone). "Local Engineering," Ald. B. J. Watson. Wig and Gown Hotel, 7.30 p.m.

NORTH EAST ELECTRICAL CLUB. "Electricity in Mines," C. A. Ritchie. Liberal Club, 98 Pilgrim St, Newcastle, 6.30 p.m.

A.S.E.E. (Bolton). "Elements of TV," Mr. Hollingsworth. Balmoral Hotel, Bradshawgate, 7.30 p.m.

A.S.E.E. (Leeds). Demonstration of Stage Lighting Effects, E. E. Farraday. Great Northern Hotel, 7.30 p.m.

A.S.E.E. (N.E. London). "Modern Lighting Technique," R. Pye. Angel Hotel, Ilford, 8 p.m.

TUESDAY, 2 NOV.

I.E.E. (London Measurement). Discussion on "Boreholes-Instrumentation for Measurements at Depth," P. Threadgold. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (N. Midland). "Technical Arrangements for Sound and TV Broadcasts of Coronation." W. S. Proctor, M. J. L. Pulling and F. Williams. Elect. Offices, 1 Whitehall Rd, Leeds, 6.30 p.m.

I.E.E. (N. Western). "Aluminium-Sheathed Cables," P. M. Hollingsworth and P. A. Raine, Engrs. Club, Albert Sq, Manchester, 6.15 p.m.

I.E.E. (S.E. Scotland). "Possibilities of Cross-Channel Power Link between British and French Supply Systems," D. P. Sayers, M. E. Laborde, and F. J. Lane. Carlton Hotel, North Bridge, Edinburgh, 7 p.m.

INSTN. OF MECHANICAL ENGRS. "Place of Gas Turbine cum Two-Stroke Engine/Gas Generator Unit in Future Pattern of Oil Engine Industry." Birdcage Walk, Westminster, 6.45 p.m.

INCORP. PLANT ENGRS. (London). "Science of Applied Chromatics," E. M. Barford. Royal Soc. of Arts, John Adam St, W.C.2, 7 p.m.

A.S.E.E. (S.E. London). "Modern Magnets." Congregational Church Hall, Court Rd, Eltham, 8 p.m.

A.S.E.E. (S. Wales). "Design of Electrical Installations in Public Buildings—especially in Schools," R. C. Woodward. Angel Hotel, Westgate St, Cardiff, 7.30 p.m.

A.S.E.E. (W. London). "Push Button and Loudspeaker Intercommunication Telephone," D. H. Weston. Windsor Castle Hotel, 134 King St, Hammersmith, 7.30 p.m.

WEDNESDAY, 3 NOV.

I.E.E. (Tees-side). "Assessment of Impregnated Pressure Cable." L. G. Brazier, D. T. Hollingsworth and A. L. Williams. Cleveland Instn., Middlesbrough, 6.30 p.m.

I.E.E. (S.W. Scotland). "Possibilities of Cross-Channel Power Link between British and French Supply Systems," D. P. Sayers, M. E. Laborde and F. J. Lane, 39 Elmbank Cres, Glasgow, 7 p.m.

I.E.E. (Southern). "Assessment of Impregnated Pressure Cable," L. G. Brazier, D. T. Hollingsworth and A. L. Williams. Elect. Offices, Hove, 6.30 p.m.

I.E.S. (Edinburgh). "Design and Application of Flameproof Lighting Equipment," D. A. Strachan. 12 Rothesay Place, 7 p.m.

I.E.S. (Manchester). Annual dinner. Presidential address by E. C. Lennox. Cafe Royal, 7 p.m.

I.E.S. (Newcastle). "Sports Lighting Symposium." Roadway Hse, 8 Oxford St, 6.15 p.m.

JNR. INSTN. OF ENGRS. (Midland). "Modern Tendency of Railway Signalling Practice," W. J. Sadler. James Watt Inst., Great Charles St, Birmingham, 7 p.m.

INCORP. PLANT ENGRS. (Leicester). "Process and Industrial Heating," J. C. Edwards. College of Art and Technology, The Newerkes, 6.30 p.m.

INCORP. PLANT ENGRS. (Southampton). "Maintenance Costs," by H. E. Baker, and "Steam Costs," by E. C. Rogers. Polygon Hotel, 7.30 p.m.

A.S.E.E. (Preston). "Rotary Switches." G. R. Cowan, Chamber of Commerce, 49a Fishergate, 7.30 p.m.

A.S.E.E. (N. London). "Cored Solders," preceded by film. H. L. Schuster. Queens Head, 77 Green Lanes, Harringay, N.4, 7.45 p.m.

THURSDAY, 4 NOV.

I.E.E. (London). "A Transatlantic Telephone Cable," Sir Gordon Radley, G. W. Gilman and R. J. Halsey. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (Rugby). Chairman's address by D. Edmundson. Meeting at Banbury.

I.E.S. (Glasgow). "Design and Application of Flameproof Lighting Equipment," D. A. Strachan. 39 Elmbank Cres., 7.30 p.m.

I.E.S. (Nottingham) "Lighting of Shipyards," J. S. McCullock. Elect. Offices, Smithy Row, 6 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Scottish). "Latest Developments in TV Cameras," H. McGhee. 39 Elmbank Cres, Glasgow, 7 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Merseyside). "Radio Receiving Valve Manufacture," G. P. Thwaites. College of Tech., Byron St, Liverpool, 7 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N. Western). "Electronic Servo Mechanisms," J. L. Russell. College of Tech., Sackville St, Manchester, 7 p.m.

A.S.E.E. (S. London). Lecturettes at Cafe Royal, Croydon, 8 p.m.

CHELMSFORD ENGRNG. SOC. "Owen Falls, Uganda Hydro-Electric Development," Sir Charles Westlake. Hoffmann's Social Hall, 7.30 p.m.

FRIDAY, 5 NOV.

I.E.E. (N. Eastern) "Safety in Use of Portable and Transportable Equipment in Industry," J. W. Bunting. Cumberland Tech. College, Workington, 7 p.m.

INSTN. OF MECH. ENGRS. "Experimental Coal-burning Gas Turbine," Prof D. L. Mordell. Birdcage Walk, Westminster, 5.30 p.m.

INSTN. OF FUEL (S. Wales). "Back-pressure Regeneration," C. Ungold. Y.M.C.A., Kingsway, Swansea, 6 p.m.

IPSWICH ELECTRICAL ASSOC. "Electrical Installations in Ships," E. L. Towle. Electric Hse, 7.30 p.m.

BIRMINGHAM ELECTRIC CLUB. Golden Jubilee Banquet at Grand Hotel, Colmore Row, 6.30 p.m.

A.S.E.E. (N.W. London). "Control of Industrial Refrigerating Plant," F. J. Hagger. Century Hotel, Forty Ave, Wembley Park, 8.15 p.m.

A.S.E.E. (Liverpool). "Modern Lighting Technique," R. Pye. Liverpool Engineering Society, 24 Dale St, 7.30 p.m.

TRADE NOTES

Change of Address. British Insulated Callender's Cables Ltd. announce that on 1 Nov. their Bedford depot is to be closed down and a new depot opened at 81, Dumfries St, Luton, Beds. The telephone number of the new Luton depot will be Luton 6866. Mr W. H. Spillman will be in charge.

The Cardiff Office of Babcock and Wilcox Ltd., formerly at 102 St Mary's Rd, is now at 26 High St, Cardiff. The new telephone number is Cardiff 29366.

The address of Kubeice Ltd. is now 39 New Oxford St, W.C.1. Telephone Temple Bar 0465.

The Lincoln Section Office of the East Midlands Division, B.E.A., has been transferred to Staythorpe. The address of the section engineer, Mr T. A. Clark, is: B.E.A. Transmission Section Office, Staythorpe 132 kV Substation, Newark.

Expansion. A. K. Fans Ltd., whose head office was 20 Upper Park Rd, N.W.3, have taken over further factory space at 352 Goswell Rd, E.C.1.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Hercules. 730,682. Class 11. Immersion heaters. Range Boilers Ltd, Bridge St, Stalybridge, Cheshire.

Pelefilm. 732,062. Class 17. Insulating materials in the form of films. Metropolitan-Vickers Electrical Co., Ltd., 1/3 St. Paul's Churchyard, E.C.4.

Aeraxial. 732,315. Class 9. Cables. Aerialite Ltd., Castle Works, Stalybridge, Cheshire.

Glasmetic. 733,178. Class 9. Terminal boxes. Pressed Steel Co. Ltd., Cowley, Oxford.

"Renda." 731,485. Class 10. Electrical dental appliances. M. G. Petralis, 115 Hoxton St, N.1.

Voltanol. 732,773. Class 17. Insulating materials. Ajama Chemical Co. Ltd., North Hyde Works, Southall Lane, Southall, Middx.

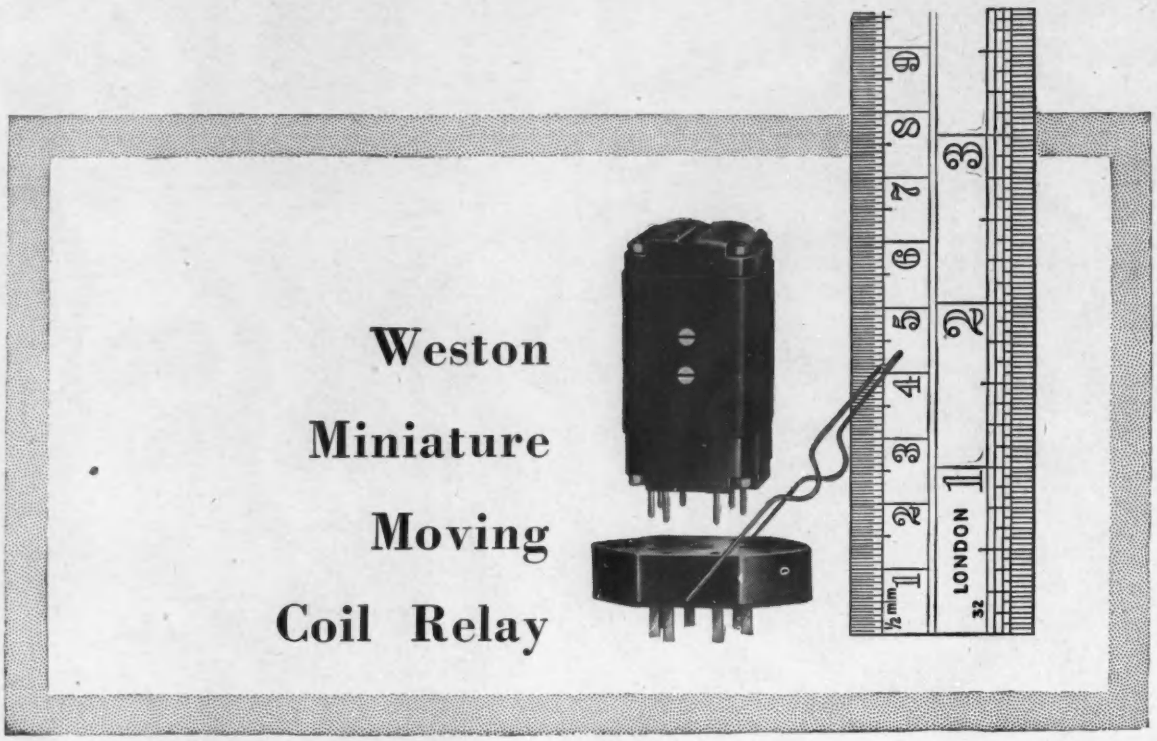
it's reliable and efficient service by

HACKBRIDGE TRANSFORMERS

★ Equipments illustrated are: A typical Hackbridge distribution transformer, 1,000 kVA three phase 11,000/460 volts, and Hackbridge mobile self-contained mine substation unit comprising a 300 kVA three phase 3,000/550 volt transformer, H.V. and L.V. switchgear and protective equipment.

HACKBRIDGE AND HEWITTIC ELECTRIC CO., LIMITED
WALTON-ON-THAMES - SURREY - ENGLAND
Telephone: Walton-on-Thames 760 (8 lines) *Telegrams: "Electric, Walton-on-Thames"*

T.16.



The "Weston" Model S.115 Miniature Moving Coil Relay functions as a sensitive "on-off" current switch, and will operate on a power input of only 5 microwatts. Generally the relay is supplied with a centre stable moving contact, but a biased version which affords a single break, or a break followed by a make, is also available. The moving coil can be provided with two windings which offer considerable scope in circuitry. The relay has a seven pin base and is supplied with a separate chassis or panel mounting socket with retaining clip: mounting position is unimportant. Size $1\frac{1}{2}''$ x $\frac{3}{4}''$ x $2\frac{1}{4}''$, weight $1\frac{3}{4}$ oz. only. List No. W.46 gives further particulars and is available on request, but these relays give best service when they are specially designed to suit the circuit in which they are to be used, and we shall be delighted to co-operate on receipt of the pertinent information.

Other WESTON relays

MODEL S54. A relay of extreme sensitivity (size 4-1/5" x 3-1/5"). The high torque developed by the moving system ensures positive contact pressure. Leaflet — List No. W.45 gives details.

MODEL S124. A sensitive relay (size 2-3/16" x 2-3/16") with magnetic hold-on contacts having a higher rating than the other models. Leaflet — List No. W.43 gives details.

SANGAMO WESTON LIMITED

ENFIELD, MIDDLESEX · TEL: ENField 3434 (6 lines) & 1242 (6 lines) GRAMS: SANWEST, ENFIELD

Scottish Factory: Port Glasgow, Renfrewshire. Port Glasgow 41151

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CLASSIFIED ADVERTISEMENTS

Advertisements should be sent to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London, W.C.2, before 10 a.m. on TUESDAY of the week of issue. Official Displayed Advertisements are charged at 32s. 6d. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted four insertions at twice the single insertion rate. Fee for Box Number and postage on replies 2s.

TENDERS INVITED

SOUTHAMPTON C.B.C.

invites Tenders (separate) for REWIRING ELECTRICAL INSTALLATIONS at any or all of the following:

A. Regents Park Secondary Girls School.

B. Mount Pleasant School.

C. Northam Junior Mixed School.

Forms and particulars from Borough Architect, Civic Centre, Southampton. £5 deposit for each set of documents to be received by 1 Nov., 1954. R.I.B.A. Contract plus Supplementary Conditions available for inspection. Deposits refunded on receipt of bona fide Tender not subsequently withdrawn or return of documents. Tenders to Town Clerk, Civic Centre, Southampton, by 10 a.m., 15 Nov., 1954. (N 532)

COUNTY BOROUGH OF SOUTHAMPTON

invites Tenders from Electrical Contractors for the ELECTRICAL INSTALLATION at THE TECHNICAL COLLEGE (RECONSTRUCTION, STAGE 5) to be Sub-Contract with Main Contractor (R.I.B.A. Contract plus Supplemental Conditions available for inspection). Forms and particulars from Borough Architect on £5. deposit by 5 Nov., 1954, refunded on receipt of bona fide Tender not subsequently withdrawn, or return of documents. Tender to the Borough Architect, Civic Centre, Southampton, by 10 a.m. on 22 Nov., 1954. (N 533)

LICHFIELD CITY COUNCIL

GROUP "A" STREET LIGHTING
STAFFORD/TAMWORTH COUNTY ROAD A.51

THE Council invite Tenders for the Supply and Installation of Forty-nine Steel Columns, Five Steel Brackets, Thirty-Eight Sodium Lanterns and Eighteen Fluorescent Lanterns.

Application for Contract Documents should be made to the City Engineer and Surveyor — D. Oglesby, A.M.I.MUN.E., M.R.SAN.I., City Engineer and Surveyor, The Guildhall, Lichfield.

Applications must be accompanied by a Deposit of Two Guineas which is returnable on receipt of a bona fide Tender not subsequently withdrawn.

Tenders in a plain sealed envelope endorsed "Street Lighting" must be received by the undersigned not later than noon on Thursday, 18 Nov., 1954.

The Council do not bind themselves to accept the lowest or any Tender.

H. J. CALLENDER,
Town Clerk.

Guildhall,
Lichfield. (N 556)

Box No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London, W.C.2.

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments in the Northmet Sub-Area.

Sub-Area Headquarters

Southgate, London, N.14

GENERAL ASSISTANT ENGINEER (PLANNING AND DEVELOPMENT)

158/54.R.

Candidates should have had a sound technical training and experience in the planning and construction of large urban and rural distribution systems (including substations) at voltages up to 33 kV.

Salary in accordance with Class N, Grade 13, of the National Joint Board Salary Agreement commencing at £692 plus London Allowance.

Apply to the Manager, Northmet Sub-Area, Eastern Electricity Board, Northmet House, Southgate, London, N.14.

St. Albans and Welwyn District

(1) SENIOR SERVICE CENTRE ASSISTANT

157/54.R.

(2) GENERAL ASSISTANT ENGINEER

156/54.R.

Candidates for (1) should be capable of taking charge of a Service Centre, controlling service centre staff and handling consumers' enquiries efficiently. They should have had extensive sales and consumer service experience and possess a thorough knowledge of appliances, contracting and the application of standard tariffs. The possession of the E.D.A. Salesmanship Diploma or E.A.W. Certificate will be an advantage.

Salary in accordance with Grade 2 (£485 x £20—£545) of the National Joint Council Salary Agreement.

Candidates for (2) should have had a sound technical training and experience in the construction, operation and maintenance of H.V. and L.V. overhead and underground systems, including substations.

Salary in accordance with Class F, Grade 11, of the National Joint Board Salary Agreement, commencing at £548.

Apply for both positions to the District Manager, Eastern Electricity Board, 107 St Peter's Sq, St. Albans, Herts.

Future salaries and conditions of service for all these appointments will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications by letter, stating age, education, qualifications and experience with details of present appointment and salary, should be submitted to the Manager concerned within fourteen days of the appearance of this advertisement. (N 547)

TRINIDAD AND TOBAGO ELECTRICITY COMMISSION

APPOINTMENT OF SENIOR ASSISTANT ACCOUNTANT

APPLICATIONS are invited from Chartered, Incorporated or Certified Accountants with some experience in the Accounting and Stores branches of a modern industrial concern, preferably in an Electricity Supply Undertaking, to fill the post of Senior Assistant Accountant with the Trinidad and Tobago Electricity Commission. Preference will be given to applicants who are also Members of the Institute of Costs and Works Accountants.

The commencing salary is £1,100 a year, rising by £27. 10s. to £1,182. 10s. When the total sales of electricity exceed 100 million units the salary range will be £1,210 to £1,292. 10s. A cost of Living Allowance of £25 per year and a House Allowance based on salary received, but not to exceed £10. 8s. 4d. per month, if married, and £6. 5s. per month, if single, are also payable and an outfit allowance of £60 will be granted on arrival.

The successful applicant will be required to undergo a medical examination. He will be provided with first class passages for himself, his wife and two children up to the age of 18, on appointment. Leave passages to the United Kingdom or equivalent will be provided every three years. Vacation, casual and sick leave on full pay.

General details of Trinidad's climate, income tax, etc., can be obtained from the West India Committee at 40 Norfolk St, London, W.C.2.

Applications giving full details of qualifications, experience, and personal particulars, together with two recent references, should reach the General Manager, Trinidad and Tobago Electricity Commission, P.O. Box 121, Port-of-Spain, Trinidad, B.W.I., on or before 18 Dec., 1954. (N 536)

MAURITIUS CENTRAL ELECTRICITY BOARD

THE Board is shortly embarking on an all-island scheme of electrification involving the construction of thermal and hydro power stations together with some 400 miles of overhead lines, and applications are invited for the following two senior appointments:

(*a*) GENERATION AND DISTRIBUTION ENGINEER (M2A/40494/EE)

Salary scale equivalent to £1,500 rising to £1,875 a year. The post will carry responsibility for all engineering matters, including the operation of Power Stations and the design, layout, survey, construction and operation of H.V. and L.V. lines and substations. Candidates should be between 35 and 45 years of age and must be fully qualified Electrical Engineers with administrative ability and previous experience in a public electricity supply undertaking. Experience of the maintenance and operation of either Diesel or Hydro-Electric Generating Plant is desirable.

(*b*) COMMERCIAL OFFICER (M2A/40495/EE)

Salary scale equivalent to £1,350 rising to £1,650 a year. The post will carry responsibility for all commercial matters relating to the supply of electricity to consumers, including correspondence, quotations, negotiations for special arrangements, etc. Applicants should be between 30 and 45 years of age, must have had extensive commercial experience in a public electricity supply undertaking and be capable of building up an active sales organisation. They should also be familiar with the framing and application of tariffs and the keeping of consumers' records and statistics.

The appointments will be for one tour of 3 years in the first instance with prospect of permanency. Superannuation Scheme. Local leave two weeks each year, with overseas leave of 6 months at the end of the tour. Free first class passages for the officer, his wife and two children. Assistance will be given towards cost of housing. Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience quoting the reference of appointment applied for. (N 543)

BRITISH ELECTRICITY AUTHORITY
London Division

APPLICATIONS are invited for the following superannuable posts. Conditions of service in accordance with N.J.B. Agreement, Schedule A or C. Salary includes London Allowance. Qualifications entitling to Graduate Membership of the I.E.E. or I.MECH.E. an advantage, for posts "A."

(a) ASSISTANT MAINTENANCE ENGINEER (MECHANICAL)
HACKNEY GENERATING STATION
Vacancy No. 54/884

Candidates should have served an apprenticeship and be experienced in the maintenance of turbines, boilers and other mechanical plant. Salary—Class F, Grade 9= £637. 7s. p.a.

(a) SHIFT CHARGE ENGINEER
STEPNEY GENERATING STATION
Vacancy No. 54/885

Sound Electrical and Mechanical training necessary with experience in efficient operation of generating station. Character and ability to deal with Staff problems is important. Salary—Class F, Grade 7=£731. 17s. p.a.

SECOND ASSISTANT ENGINEER
(COMMUNICATIONS SECTION)
TECHNICAL DEPARTMENT DIVISIONAL HEADQUARTERS
Vacancy No. 54/886

The successful candidate will be directly responsible to the Technical Engineer for the construction, testing and maintenance of a private communications system owned and maintained by the Authority, using line, teleprinter and radio equipments and techniques. Previous experience on this class of apparatus is essential and telephone manufacturer's works experience desirable.

Adequate administrative experience is essential and preference will be given to candidates who have a University Degree, preferably in Physics or Light Current Electrical Engineering. Corporate Membership of the I.E.E. or the Inst. of Physics is also desirable. Salary within Class AX/EX Grade 2=£875. 14s. to £1,113/£1,133 p.a.

Applications, quoting vacancy number, may be made on forms obtainable from Divisional Secretary, British Electricity Authority, London Division, P.O. Box 136, Generation Hse, Gt. Portland St, W.1, and be received within 14 days of this advertisement. (N 534)

YORKSHIRE ELECTRICITY BOARD
No. 5 (Wakefield) Sub-Area

Castleford District
SECOND ASSISTANT DISTRICT ENGINEER

APPLICANTS must be Corporate Members of the Institution of Electrical Engineers or hold equivalent qualifications. They must have had a sound practical training and extensive experience in the design, construction, operation and maintenance of H.V. and M.V. overhead and underground distribution systems, substation plant and ancillary equipment, preferable in a large undertaking.

Salary—N.J.B., Class F, Grade 7, £697/£718 per annum.

Castleford District
CONSUMERS' ENGINEER

Applicants, who must have had a sound practical training and considerable experience in the work of a Consumers' Engineer, will be required to give advice to all classes of consumer concerning the utilisation of electricity.

Experience is required in negotiations for supply; the interpretation and application of the I.E.E. Wiring Regulations and other regulations concerned with the testing and inspection of consumers' installations; tariffs; sales development; the control of staff and manual workers.

Salary—N.J.B. Class F, Grade 8, £635/£664 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Rd, Wakefield, not later than 11 Nov., 1954. (N 527)

CITY COUNCIL OF SINGAPORE
ELECTRICITY DEPARTMENT

APPLICATIONS are invited for the post of BOILER HOUSE SHIFT ENGINEER in the City Electricity Department, appointment in the first instance being on 3 years' agreement. On satisfactory completion of the agreement the appointee would normally be offered emplacement on the permanent establishment.

Applicants must possess First Class Board of Trade Steam Certificate or Graduate Membership of the Institution of Mechanical Engineers, or Higher National Certificate (Mechanical) or equivalent and must have experience in the operation of large modern high pressure oil/coal fired boiler plant. Minimum age: 24.

The salary offered is $660, $690 and $720 a month for the 1st, 2nd and 3rd year respectively. Expatriation and cost of living allowances at such rates as may be approved by the Council from time to time are payable. The existing rates are as follows:

Expatriation Allowance: £287 per annum on basic salaries up to $720 a month.

Present rate of Cost of Living Allowance payable on basic salary between $660 and $720 a month is £238 per annum for a single man, £345. 16s. to £362. 12s. per annum for a married man: £466. 4s. to £495. 12s. per annum for a married man with one or more dependent children. (A dependent child means an unmarried child, including a stepchild or a legally adopted child, under the age of 17, or receiving full time educational instruction and below the age of 21.)

For a single man the minimum total emoluments on a basic salary of $660 a month would amount to £1,449 per annum: for a married man with no children £1,556. 16s. per annum and for a married man with one or more children £1,677. 4s. per annum.

The exchange rate is approximately $1 to 2s. 4d. sterling.

Partly furnished quarters provided if available at 6% of basic salary or Housing Allowance of 10% of basic salary (subject to a maximum of $120 p.m.) paid in lieu.

Free passages will be provided for appointee, his wife and his own children under the age of 12 years at the date of sailing subject to a maximum of three full passages.

Leave: One month per year of service may be granted on satisfactory completion of agreement at the discretion of the Council. If placed on the permanent establishment on completion of the agreement the appointee will be required to serve a further year before proceeding on leave. The present rate of leave is 4 days per month of resident service. Local leave of 14 days a year cumulative to a maximum of 28 days may also be granted.

Compulsory Provident Fund contributions at present 7½% of salary (but not allowances) to which the Council donate 7½% rising to 10% after 10 years' service, 15% after 15 years' service and 20% after 20 years' service. This scheme is under review.

Applications in DUPLICATE giving full information regarding all experience, qualifications and personal circumstances, with copies of 3 recent testimonials, also in duplicate, to Messrs Allen and Williams 1 Victoria St, London, S.W.1, before Tuesday, 16 Nov., 1954. (N 501)

BRITISH ELECTRICITY AUTHORITY
South Wales Division

Vacancy No. 103/54

APPLICATIONS invited for superannuable N.J.B. appointment of ASSISTANT SHIFT CHARGE ENGINEER at Uskmouth Power Station. Salary K.9, £766/£796 per annum.

H.N.C. and regular apprenticeship desirable. Operating experience in a modern generating station essential.

Application forms obtainable from Secretary, South Wales Division, British Electricity Authority, Twyn-y-Fedwen Rd, Gabalfa, Cardiff, to be returned by 8 Nov., 1954. 20 Oct., 1954. (N 521)

STATION ENGINEERS

required by Air Ministry at R.A.F. and M.C.A. stations. Qualifications and experience required: (*a*) Ordinary National Certificate in Electrical Engineering or equivalent standard of technical education. (*b*) Recognised apprenticeship in electrical engineering. (*c*) Three years' responsible engineering employment preferably on operation and maintenance of mine, factory or workshop plant and services. Supervisory experience an advantage as duties entirely supervisory and cover installation, operation and maintenance of high and medium voltage distribution system, internal electrical installations, and other miscellaneous installations, tools and equipment. Commencing salary according to age, qualifications and experience (normally £550 at age 28 or over), on range £510/£640. Appointments include liability for service overseas for which special allowance payable in addition to higher salary. Appointments non-pensionable. Only natural born British subjects. Write, giving date of birth, education, full details of qualifications and experience of posts held (including dates) to E.A.1564, Appointments Officer, Ministry of Labour and National Service, 1-6 Tavistock Sq, W.C.1, by 12 Nov., 1954. No original testimonials should be sent. Only candidates selected for interview will be advised. (N 520)

THE BRITISH IRON & STEEL RESEARCH ASSOCIATION

GRADUATE required by the above Association for work concerned with experimentation and redesign of control points in steelworks to fit the human operator. An interest in this type of research work is essential. Some knowledge of electrical engineering is desirable. Age 22-25. Starting salary according to age, qualifications and experience, in the range £525/£650 p.a. Post is superannuated under the F.S.S.U. Location of work London. Written applications only quoting "Control" to Personnel Officer, B.I.S.R.A., 11 Park Lane, London, W.1.
22 Oct., 1954.
LBAM/VC/111. (N 537)

BRITISH ELECTRICITY AUTHORITY
South Western Division

TECHNICAL STAFF VACANCIES

(*a*) STATION SHIFT CONTROL ENGINEER, Newton Abbot Generating Station. N.J.B. "F" 10, £577/£598.

(*b*) STATION SHIFT CONTROL ENGINEER, Plymouth "B" Generating Station. N.J.B. "G" 10, £608/£630.

(*c*) ASSISTANT SHIFT CHARGE ENGINEER, Plymouth "A" Generating Station. N.J.B. "F" 9, £607/£629.

(*d*) ASSISTANT MAINTENANCE ENGINEER (Mechanical), Plymouth "A" Generating Station. N.J.B. "F" 8, £635/£664.

(*e*) JUNIOR ENGINEER (Control), Hayle Generating Station, N.J.B. Clause 35, Class "F" within Grades 15—14, £402/£466.

Superannuation Scheme.

Applicants for (*a*) and (*b*) should possess good technical qualifications, and have had training and experience in the control and operation of steam generating plant and main switchgear.

For (*c*) applicants should have had a sound technical training and practical operating experience in a modern generating station.

For (*d*) applicants must have had a thorough practical mechanical engineering training, and considerable experience in the maintenance of turbines, boilers and auxiliary plant. Corporate membership of the Institution of Mechanical Engineers or equivalent an advantage.

For (*e*) applicants should possess O.N.C. in Electrical or Mechanical Engineering or equivalent. Previous generating station experience an advantage.

Please state clearly for which appointment you wish to be considered.

Applications on Form A.E.6/ACT, obtainable from the Divisional Secretary, 26 Oakfield Rd, Bristol, 8, should be completed and returned by 8 Nov., 1954. (N 553)

BRITISH ELECTRICITY AUTHORITY
East Midlands Division

APPLICATIONS are invited for the following positions within the Division:

THIRD ASSISTANT ENGINEER (CONSTRUCTION) TRANSMISSION DEPARTMENT, DIV. H.Q.

Vacancy No. 159/54/ET

Applicants must have had experience in the construction of E.H.T. Lines in the field from initial profile to final sag checking. Experience of pre-cast concrete structures and mass foundations will be an advantage.

Preference will be given to applicants who hold qualifications leading to Corporate Membership of Institution of Civil or Electrical Engineers, or equivalent qualifications.

The salary for this appointment will be within Schedule C, Class AX/DX, Grade 5 (£649/£858 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 8 Nov., 1954.

SHIFT CONTROL ENGINEER LONGFORD POWER STATION, COVENTRY

Vacancy No. 161/54/ET

Applicants should have had a sound training and practical experience in a modern Generating Station. The possession of technical qualifications is desirable.

Salary will be in accordance with Class G, Grade 10 (£608/£630 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 15 Nov., 1954.

JUNIOR ENGINEERS, FREEMEN'S MEADOW POWER STATION, LEICESTER

Vacancy No. 162/54/ET

Some experience in Control Room and Boiler House work in a large P.F. Station is required. Technical qualifications up to H.N.C.

Salary in accordance with Class H, Grade 15 (£448 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 15 Nov., 1954.

FIRST ASSISTANT STATION CHEMIST DRAKELOW GENERATING STATION

Vacancy No. 163/54/ET

Applicants should be Associates of the Royal Institute of Chemistry or hold the Higher National Certificate in Chemistry.

Experience of Power Station practice essential.

Salary in accordance with Class J, Grade 9 (£719/£750 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 15 Nov., 1954.

ASSISTANT MAINTENANCE ENGINEER (MECHANICAL) DRAKELOW POWER STATION

Vacancy No. 164/54/ET

Previous operation and maintenance experience with modern high pressure plant, with technical qualifications up to H.N.C. standard essential.

Salary in accordance with Class J, Grade 9 (£719/£750 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 15 Nov., 1954.

ASSISTANT MAINTENANCE ENGINEER (ELECTRICAL) DRAKELOW POWER STATION

Vacancy No. 165/54/ET

Previous operation and maintenance experience with all types of electrical plant in a modern Power Station with technical qualifications up to H.N.C. standard as a minimum requirement.

Salary in accordance with Class J, Grade 9 (£719/£750 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 15 Nov., 1954.

TWO SENIOR DRAUGHTSMEN (CIVIL) CONSTRUCTION DEPARTMENT

Vacancy No. 167/54/ET

Candidates should have experience in the preparation of detail drawings and in the design of one or more of the following subjects:

Reinforced concrete structures.

Piled and slab foundations for heavy components.

Cable subways, Bridges and Culverts.

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Salary in accordance with Grade 5 (£567/£671 per annum) of Schedule D of the National Joint Board Agreement.

Closing date for receipt of applications, 15 Nov., 1954.

These appointments will be pensionable within the terms and provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form A.E.6/ACT which may be obtained from the Divisional Establishments Officer, British Electricity Authority, P.O. Box 25, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.

22 Oct., 1954. (N 546)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments, which are superannuable and subject to medical examination:

JUNIOR COMMERCIAL ASSISTANT (Technical) in the Warrington District. Salary £466 per annum (N.J.B. Class F, Grade 14). Applicants should be in possession of the Ordinary National Certificate in Electrical Engineering or other equivalent qualification. Duties include estimating for contracting work, advising consumers on matters relating to electricity supplies, and the utilisation of electrical equipment.

Application forms obtainable from the Manager, No. 2 Sub-Area, Sandiway Hse, near Northwich, Cheshire. Closing date: 8 Nov., 1954.

ENGINEERING DRAUGHTSMAN required in the No. 3 Sub-Area Engineering Department, Chester. Salary within the range £433/£567 per annum (N.J.B. Schedule D, Grade 6). Applicants should have had Drawing Office experience, and preferably have attained Ordinary National Certificate standard.

Application forms obtainable from the Manager, No. 3 Sub-Area, Electricity Hse, Newgate St, Chester. Closing date: 8 Nov., 1954. (N 511)

SOUTH EASTERN ELECTRICITY BOARD

ASSISTANT DISTRICT ENGINEER
Ashford District

SALARY £500 p.a. under N.J.B. Class D, Grade 11. Superannuable. Applicants should have technical training and practical experience in the construction, operation and maintenance of underground and overhead distribution systems. The position will entail standby duties.

Applications, naming 2 referees, to D. B. R. Roberts, A.I.E.E., Ashford Manager, SEEBoard, Victoria Rd, Ashford, Kent.

A. L. BURNELL,
Secretary.
(N 550)

BRITISH ELECTRICITY AUTHORITY
Eastern Division

APPLICATIONS are invited for the following post:

JUNIOR ENGINEER
NORWICH GENERATING STATION

Salary Class F/15 £402, Class F/14 £466 per annum.

The duties of the successful applicant will include assisting in the Control Room on shift and other operation and investigation duties. Preference will be given to applicants who have had previous experience in a Generating Station and who have reached the standard of the Ordinary National Certificate in Electrical Engineering or its equivalent.

Applications stating age, qualifications and experience should be sent to the Controller, British Electricity Authority, Eastern Division, Northmet Hse, Southgate, N.14, by 6 Nov., 1954.

W. N. C. CLINCH,
Controller.
(N 525)

SHIFT CHARGE ENGINEER

required for service with the Sudan Light and Power Co., Ltd., in Khartoum-Anglo-Egyptian Sudan. Basic salary in the range of £E.900/£E.1,380 per annum. Candidates must have good general education and sound technical training with ability to control and instruct staff; and extensive experience in the operation of diesel generating sets up to 1,200 kW and E.H.T. switchgear and associated control equipment. Steam generating plant will be added in the near future and an extra qualification would be knowledge of and experience in the operation of steam turbo-alternator plant and oil-fired boilers up to 400 lb per sq in. In addition to basic salary a cost of living allowance will be payable, and a kit allowance of £E.50 on appointment.

Appointment will be on contract up to 5 years, including a period of 12 months' probation, with a bonus payable on completion of the contractual period.

Free living accommodation with basic furniture or an allowance in lieu thereof. After satisfactory completion of the probationary period liberal leave on full salary with free passages.

Applications stating age, education, qualifications, experience (with particulars of posts held), present appointment and salary with names of two references should be submitted to the Secretary, The Power and Traction Finance Co., Ltd., Queen's Hse, Kingsway, London, W.C.2. (N 540)

THE NORTH WESTERN ELECTRICITY BOAR

APPOINTMENT OF SECOND ASSISTANT DISTRICT COMMERCIAL ENGINEER, ROSSENDALE DISTRICT

DUTIES will include control and supervision of industrial and domestic contract wiring, preparation of specifications and installation, repair and maintenance of appliances on consumers' premises. Preference given to applicants who are Associate Members of the Institution of Electrical Engineers.

Salary Scale: £649/£681 p.a. Grade E.7. N.J.B. Conditions.

Applications to Sub-Area Manager, No. 5 Sub-Area, The North Western Electricity Board, Jubilee St, Blackburn, by 6 Nov., 1954.

Note.—Applicants who responded to the previous advertisement of this post need not re-apply. (N512)

BRITISH ELECTRICITY AUTHORITY
South Wales Division

Vacancy No. 102/54

APPLICATIONS invited for superannuable N.J.B. appointment of GENERAL ASSISTANT ENGINEER, Technical Department, Divisional Headquarters. Salary AX/CX 8, £501/£675 per annum.

Candidates should possess a degree or H.N.C. in Electrical Engineering; some experience in the manufacture, design or erection of high voltage transmission equipment desirable. Required to assist in the design of a 132 kV transmission system and in the investigation of a wide range of system problems, including fault calculations and load flow studies.

Application forms obtainable from Secretary, South Wales Division, British Electricity Authority, Twyn-y-Fedwen Rd, Gabalfa, Cardiff, to be returned by 8 Nov., 1954. 19 Oct., 1954. (N 522)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

invite applications for the post of CHIEF COMMERCIAL ENGINEER.

In addition to experience in the Electricity Industry—not necessarily limited to the field of supply—the special character of the Board's functions make it desirable that the applicant should have extensive knowledge of general commercial development.

Salary within the range £2,500/£3,200.

Applications to the General Manager of the North of Scotland Hydro-Electric Board, 16 Rothesay Ter, Edinburgh, by 15 Nov., 1954. (N 544)

BRITISH ELECTRICITY AUTHORITY
South Eastern Division

ASSISTANT ENGINEER (INSTRUMENTS), Kingston "B" Power Station. Applicants should preferably possess Higher National Certificate and must be experienced in the Maintenance, Testing and Calibration of all types of Power Station instruments. A knowledge of Electronics would be an advantage. Class G, Grade 9, £673. 1s. per annum.

SHIFT CHARGE ENGINEER, Croydon "B" Power Station. Applicants should have had suitable technical training, together with extensive experience in the operation of modern high pressure, turbine and boiler plant. E.H.T. switchgear and in the control of labour. P.F. experience an advantage. Class J, Grade 7, £857. 17s. per annum.

N.J.B. Conditions of Service for both positions. Salaries quoted include London Allowance. Applications giving details of education, present position, experience, etc., should be received by the Station Superintendent at either Kingston "B" Power Station, Downhall Rd, Kingston, Surrey, or Croydon "B" Power Station, Beddington Farm Rd, Croydon, Surrey, according to the location of the vacancy by 6 Nov., 1954. (N 548)

SOUTH WESTERN ELECTRICITY BOARD
DEMONSTRATOR—EAST DEVON DISTRICT (EXETER)

SALARY N.J.C. Grade 1—£400/£490 per annum.

Duties include public demonstrations of cooking and electrical appliances, and advice generally on their use. Candidates should possess recognised domestic science qualification, with preferably E.A.W. Electrical Housecraft Certificate.

Application forms obtainable from the Manager, East Devon District, Pearl Assurance House, High St, Exeter, should be returned by 12 Nov., 1954. (N 551)

SOUTHERN ELECTRICITY BOARD
DRAUGHTSMAN (CIVIL ENGINEERING)

NO. 2 (Newbury) Sub-Area Office. Salary N.J.B. Schedule D, Grade 6 (£433/£567 per annum). N.J.B. Conditions of Service.

Applicants should be capable of preparing drawings and making calculations, and have knowledge of building construction, steelwork and reinforced structures.

Applications on forms obtainable from the Sub-Area Secretary, 7 Oxford Rd, Newbury, and returned to him in envelopes suitably endorsed not later than 12 Nov., 1954.

WAYLEAVE OFFICER

Newbury District of No. 2 (Newbury) Sub-Area. Salary N.J.C. Grade 2 (£485/£545 per annum). N.J.C. Conditions of Service.

Applicants should have the ability to negotiate Wayleave Agreements for the erection or laying of electric lines and installation of Substation Plant.

Applications on forms obtainable from the Sub-Area Secretary, 7 Oxford Rd, Newbury, and returned to him in envelopes suitably endorsed not later than 12 Nov., 1954.

The successful candidates for the above appointments will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible. (N 535)

DUDLEY AND STAFFORDSHIRE TECHNICAL COLLEGE

APPLICATIONS are invited for the post of ASSISTANT LECTURER in Electrical Engineering. Applicants must have had adequate industrial experience, and must be professionally qualified. Duties will begin on 1 Jan., 1955. Salary on Grade A of the Burnham Technical Report (£450 by £18—£725) with allowances, where appropriate, for graduate qualifications, training and experience.

Application forms and further particulars may be obtained from the Principal, Dudley and Staffordshire Technical College, Dudley, to whom the completed forms must be returned as soon as possible.

A. W. GIBSON,
Principal.
(N 539)

TECHNICAL INSTRUCTOR
(Electrical)

required for NIGERIA for two tours of 15-24 months or three tours of 10-12 months with option of appointment either (*a*) on agreement with prospect of permanent and pensionable employment in salary scale (including expatriation pay) £750 rising to £1,175 a year or (*b*) on temporary contract in salary scale (including expatriation pay) £807 rising to £1,269 a year with a gratuity at rate of £100/£150 a year. Outfit allowance £60. Free passages for officer and wife. Assistance towards cost of children's passages or grant up to £150 annually for maintenance in U.K. Liberal leave on full salary. Candidates, under 40 years of age, must have served an apprenticeship to electrical engineering and be experienced practical tradesmen. They should hold a C. and G. or other recognised technological certificate and have had experience in apprentice training. Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2A/29963/EE. (N 541)

SOUTH WESTERN ELECTRICITY BOARD
DISTRICT COMMERCIAL ENGINEER—TAUNTON

SALARY N.J.B. Class E, Grade 4—£803/£834 per annum.

Duties include responsibility to the District Manager for all commercial negotiations with consumers including the technical aspects; supervision of Services Centres and outside sales staff; control of installation contracting and consumers' service; organisation of exhibitions, demonstrations and publicity; preparation of revenue estimates. Candidates should possess extensive knowledge of, and have had wide experience in the commercial side of the industry and be capable of promoting a progressive commercial development policy. Corporate membership of the I.E.E. is desirable.

Application forms obtainable from the Manager, Taunton Sub-Area, The Parade, Taunton, and should be returned by 12 Nov., 1954. (N 552)

THE BRITISH IRON & STEEL RESEARCH ASSOCIATION

ELECTRICAL ENGINEER required by the Plant Engineering Division of the above Association to carry out applied research in the Iron and Steel Industry. Honours degree in electrical engineering essential. Age range 23-28. Starting salary according to age, qualifications and experience up to £800 p.a. Post is superannuated under the F.S.S.U. Location of work London. Written applications only to Personnel Officer, B.I.S.R.A., 11 Park Lane, London, W.1.
22 Oct., 1954.
LBAM/VC/112. (N 538)

INSTALLATION SUPERINTENDENT

required by SIERRA LEONE GOVERNMENT ELECTRICITY DEPARTMENT for 2 tours each of 18 to 24 months either (1) with prospect of pensionable employment at salary, etc., according to experience in scale £742 rising to £1,177 a year or (2) on temporary terms at salary, etc., according to experience in scale £789 rising to £1,272 a year with gratuity up to £150 a year. Outfit allowance £60. Free passages for officer, wife and two children up to age 10, or grant up to £150 a year for children's maintenance in U.K. Liberal leave on full salary. Candidates must have served an apprenticeship in the maintenance section of a large works or in the consumers' section of an electricity undertaking and should hold an O.N.C. or appropriate C. and G. Certificates. They must have experience in the maintenance of motors and associated control gear up to 100 H.P., the installation of power and lighting circuits to comply with I.E.E. regs., and the testing of single phase meters. Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2A/28555/EE. (N 542)

BRITISH ELECTRICITY AUTHORITY
North West, Merseyside and N. Wales Division

APPLICATIONS are invited for the appointment of SECOND ASSISTANT STATION CHEMIST at the Bromborough Power Station, Cheshire. Salary £607/£628 per annum, N.J.B. Class H, Grade 11. Superannuable and subject to medical examination.

Applicants should preferably hold a University Degree or A.R.I.C., but consideration will be given to those holding the Higher National Certificate and studying for A.R.I.C. or an equivalent qualification. A thorough knowledge of the chemical services required in a modern power station is essential.

Application Forms may be obtained from the Divisional Controller, Beaconsfield Rd, Woolton, Liverpool. Closing date, 8 Nov., 1954. (N 545)

MIDLANDS ELECTRICITY BOARD

DISTRICT COMMERCIAL ENGINEER required in the Wednesbury District of the South Staffs and North Worcs Sub-Area. Applicants should have had extensive experience in the industrial and domestic aspects of commercial work including installations, public lighting and sales and service to the consumer. The duties will include the preparation of technical schemes and estimates and participation in negotiations for the supply of electrical energy.

Technical qualifications desirable. Salary £905/£944 per annum (N.J.B. Class "G," Grade 4). Superannuable.

Apply in writing within 7 days stating age, training, qualifications, experience, present position and salary to Sub-Area Manager (Ref.: CW), Midlands Electricity Board, Toll End Rd, Tipton, Staffs.

A. STEPHENS,
Secretary.
(N 549)

BRITISH ELECTRICITY AUTHORITY
North West, Merseyside & N. Wales Division

VACANCY No. 198/54/T—SHIFT CHARGE ENGINEER, Barrow Generating Station. Salary £633/£643 (D.7).

Vacancy No. 202/54/T — STATION SHIFT CONTROL ENGINEER, Nelson Generating Station. Salary £531/£547 (D.10). Closing date 6 Nov.

Vacancy No. 205/54/T — STATION CHEMIST, Carlisle Generating Station. Salary £697/£718 (F.7). Closing date 20 Nov.

Applications, quoting vacancy No. to Controller, British Electricity House, 825 Wilmslow Rd, Manchester 20. (N 526)

ASSISTANT EXPORT MANAGER required for the development of electric lamps and lighting fittings market. Excellent prospects, pension scheme. Full details in confidence to the General Manager, Ekco-Ensign Electric Ltd., 45 Essex St, London, W.C.2. (N 509)

A LEADING CABLE MANUFACTURER wishes to appoint MANAGER to its branch in Manchester. Applicants should have wide background in the cable industry and preferably be Corporate Members of the Institution of Electrical Engineers.—Box No. 3963, Electrical Times. (N 531)

THE GENERAL ELECTRIC CO., LTD.

HOUSECRAFT ADVISER/COOKERY DEMONSTRATOR with first class experience and training is required at the Southampton Branch of the G.E.C. Preference will be given to applicants with E.A.W. Certificate and experience of demonstrating electrical equipment. Applications in writing should give full details of age and record and be sent to the

Staff Manager,
Magnet House, Kingsway, London, W.C.2,
quoting Ref. S.B.
(N 555p)

TO ALL YOUNG ELECTRICAL OR MECHANICAL ENGINEERING GRADUATES

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ASSISTANT ELECTRICAL ENGINEERS wanted for Hydro-Electric Public Utility, Plateau, Nigeria. Age 25-35, single men preferred but married men considered. H.N.C. standard or equivalent, good salary and leave conditions. Pension scheme. Written applications only with brief particulars to Messrs Mackness and Shipley, Parliament Mansions, Abbey Orchard St, London, S.W.1, who will provide full particulars. (N 464)

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Apply in writing, giving details of age, experience, etc., to Manager, Drawing Offices, British Thomson-Houston Co., Ltd., Rugby. (N 470)

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(N 444p)

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Apply in writing, giving details of age, experience, etc., to Manager, Drawing Offices, British Thomson-Houston Co., Ltd., Rugby. (N 469)

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LARGE European controlled company in Ceylon require ASSISTANT ELECTRICAL ENGINEER, age 20/30 years, preferably unmarried, sound knowledge of A.C. and D.C. distribution and work covered by general electrical contractors. Attractive terms to right man. Write Box ZT.492, Deacon's Advertising, 36 Leadenhall St, London, E.C.3. (N 485)

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required to commence duty as early as possible and to control Drawing Office, Development and Design. Must have technical and practical experience of Switchgear up to 11 kV and preferably some knowledge of Motor Control Gear. He must be a Member or Associate Member of the Institution of Electrical Engineers. Good permanent and progressive position with high salary for the right man. Pension scheme in operation. Apply by letter, marked personal, giving full particulars of experience, salary required, to Managing Director, Erskine, Heap and Co., Ltd., Lancashire Switchgear Works, Manchester 7. (N 505p)

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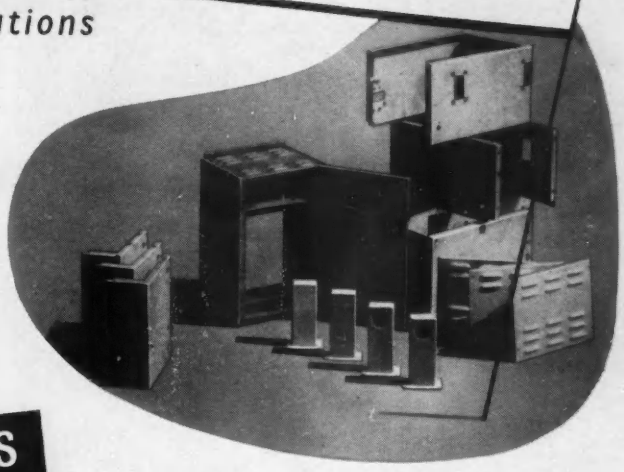

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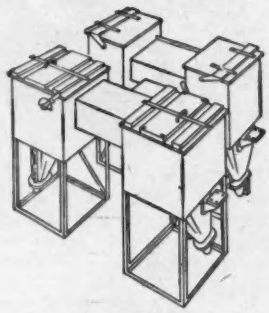

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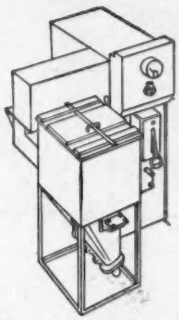

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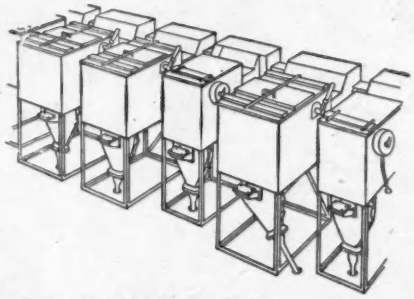

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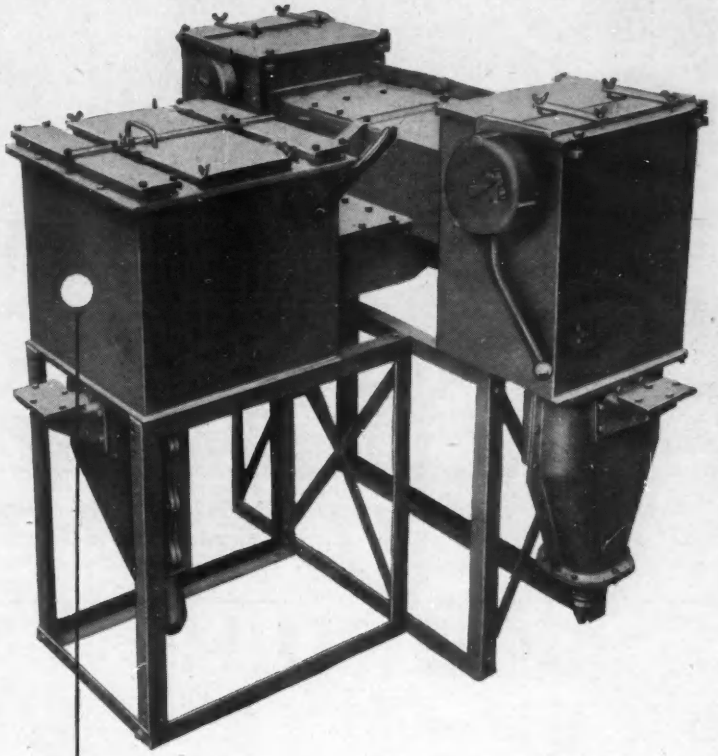

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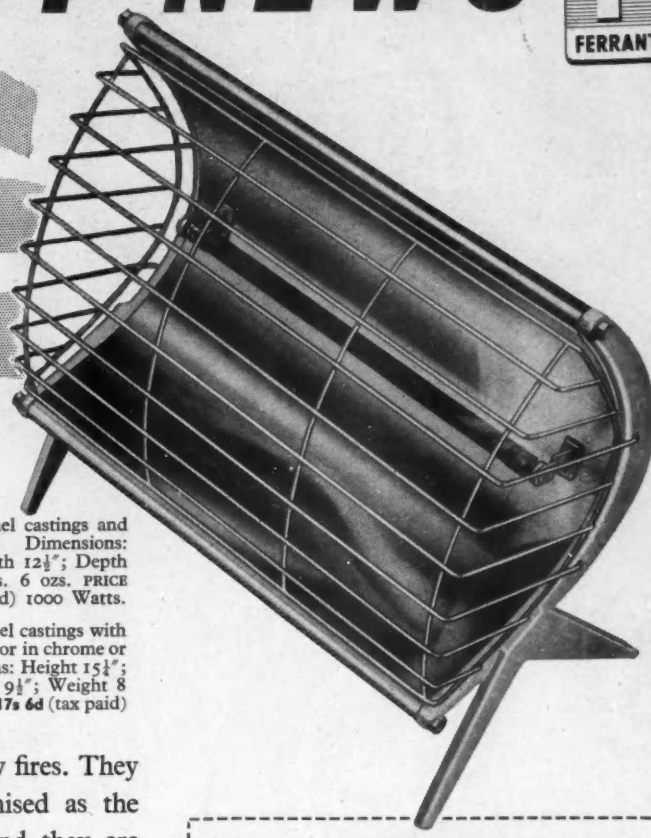
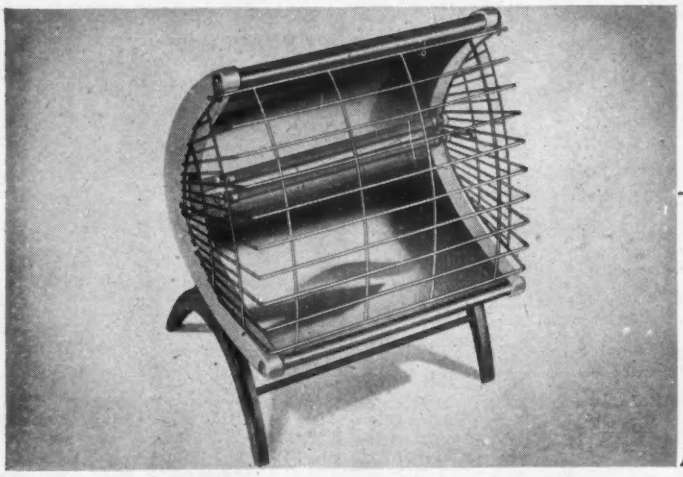


4144: Cream enamel castings and chrome reflector. Dimensions: Height 11⅜"; Width 12½"; Depth 7½"; Weight 4 lbs. 6 ozs. PRICE **£3 12s 10d** (tax paid) 1000 Watts.

4140: Cream enamel castings with brown legs. Reflector in chrome or Solium. Dimensions: Height 15½"; Width 13"; Depth 9½"; Weight 8 lbs. 4 ozs. PRICE **£8 17s 6d** (tax paid) 1000/2000 Watts.

It'll pay to make a note of these two new fires. They are Ferranti radiant fires—long recognised as the best value in electric space heating—and they are selling at really popular prices.

We'll be advertising both models in national papers this winter. Put them in your showroom—and watch the sales go up.



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2. Scientifically designed reflector, with element accurately positioned.
3. Beautifully finished—will last a lifetime.
4. Maximum warmth for low power consumption.
5. *Immediate comfort* throughout a wide zone.

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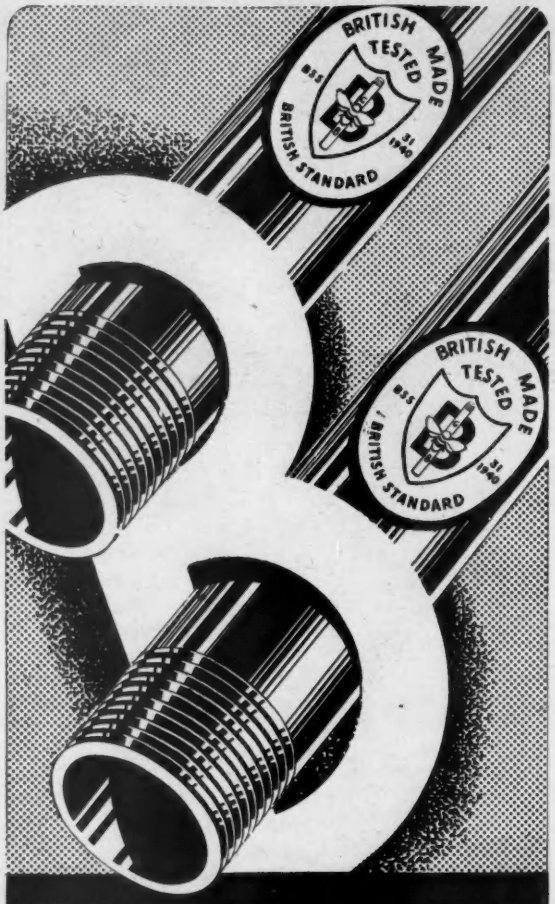

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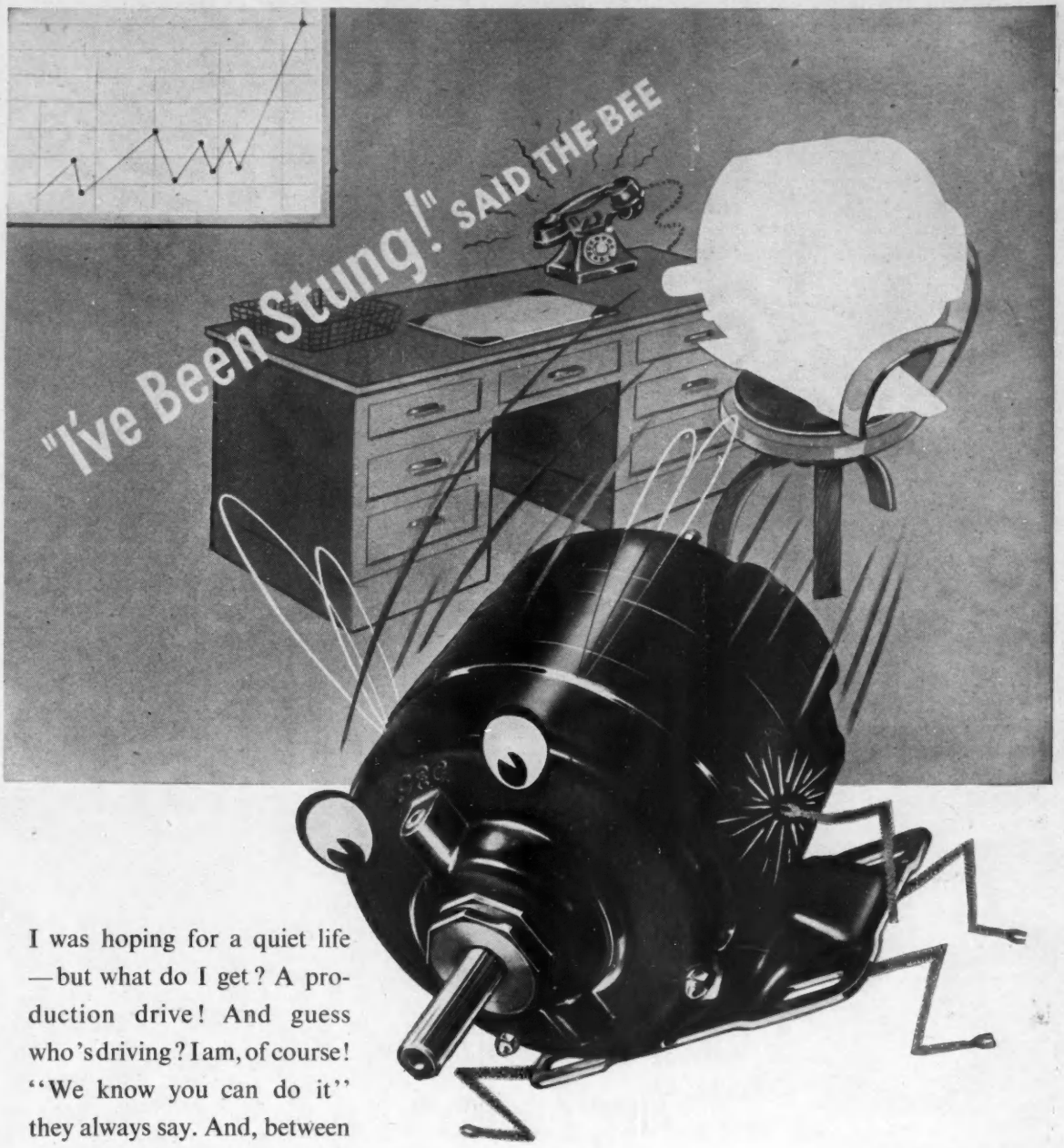

I was hoping for a quiet life—but what do I get? A production drive! And guess who's driving? I am, of course! "We know you can do it" they always say. And, between you and me, I *can*. Oh well, I suppose it's just the way I'm made!

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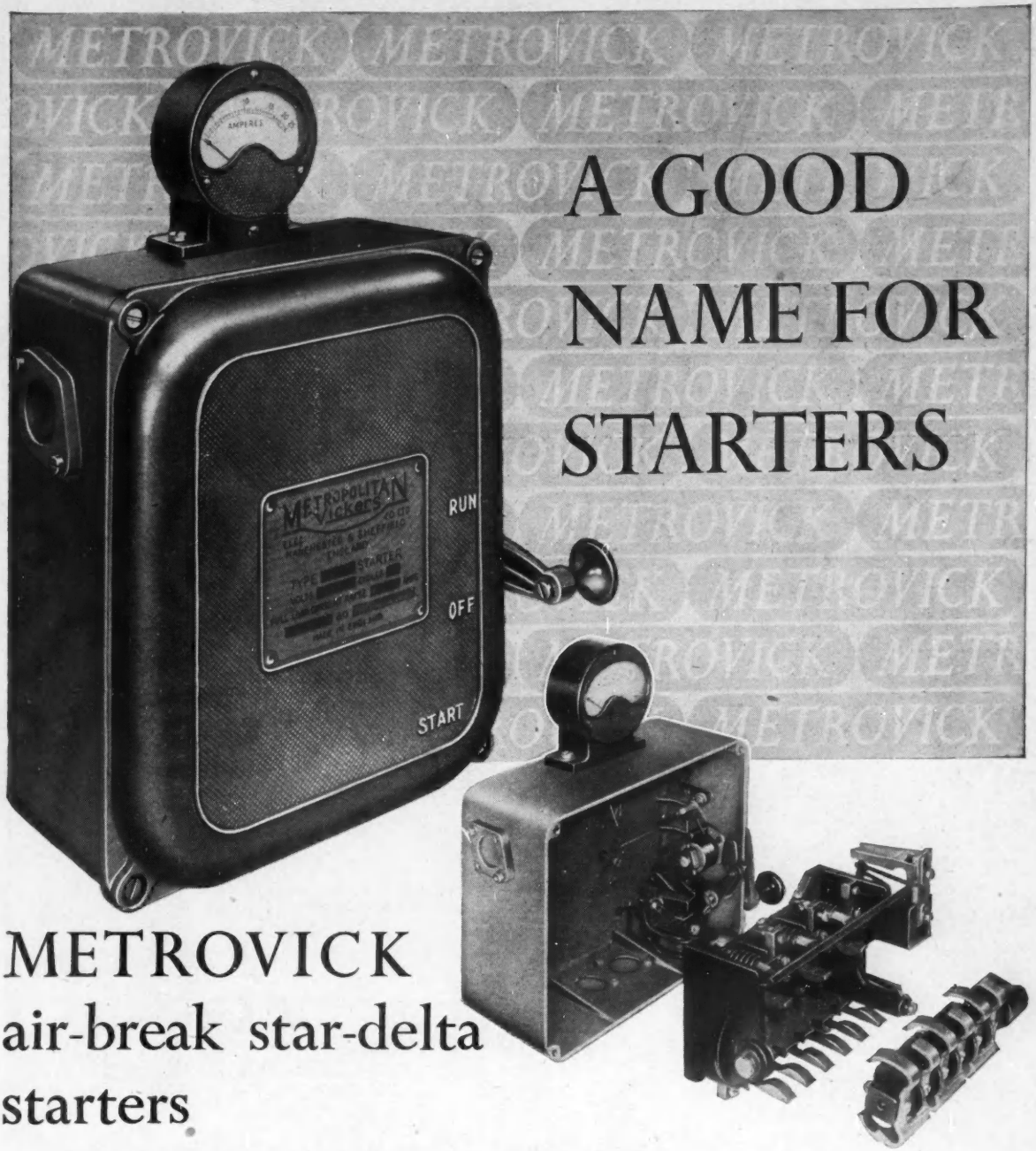

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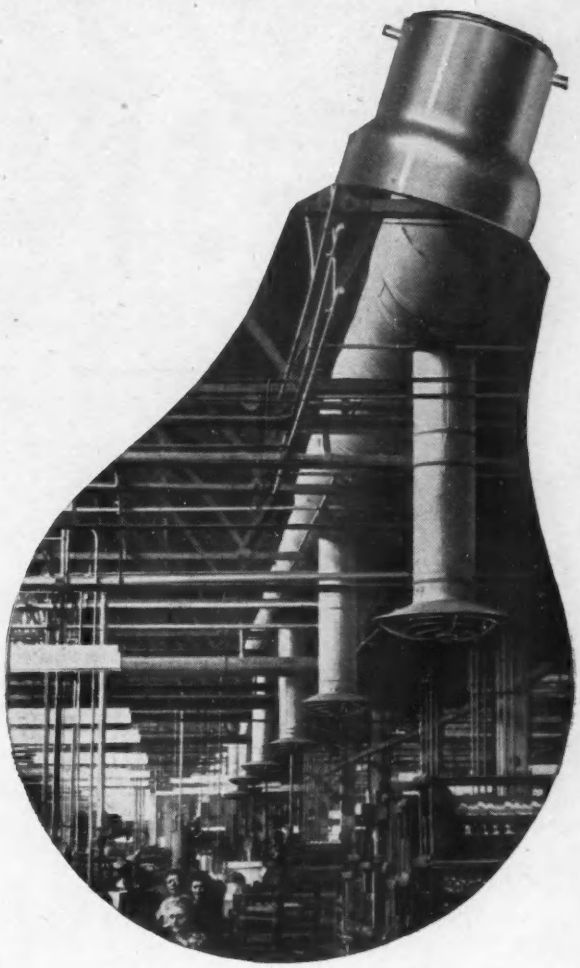

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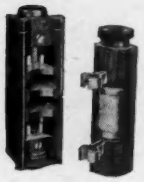

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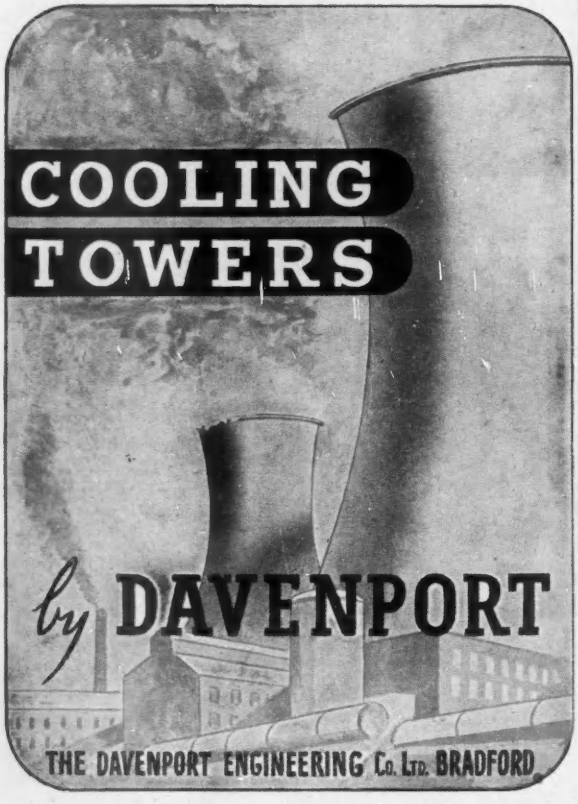

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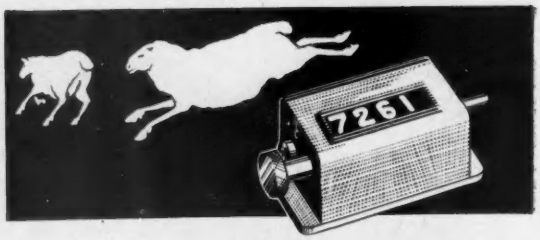

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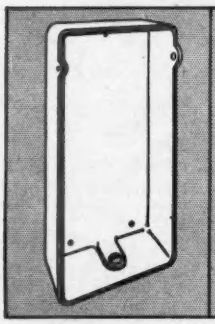	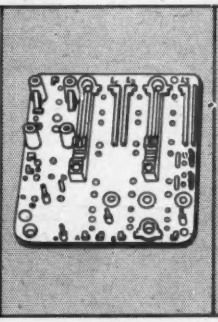	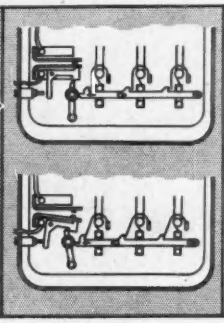	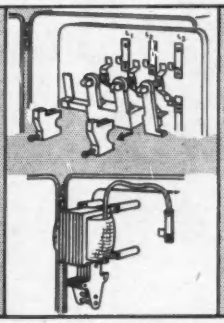	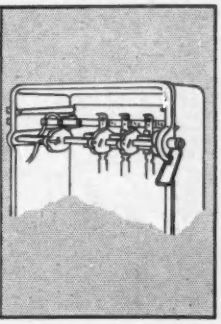
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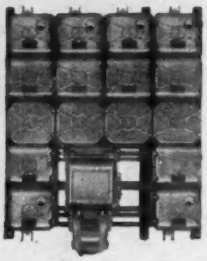

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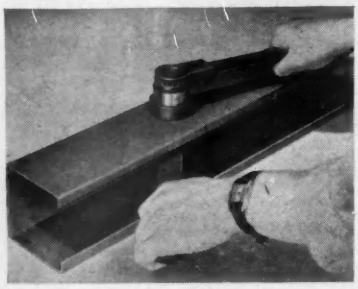

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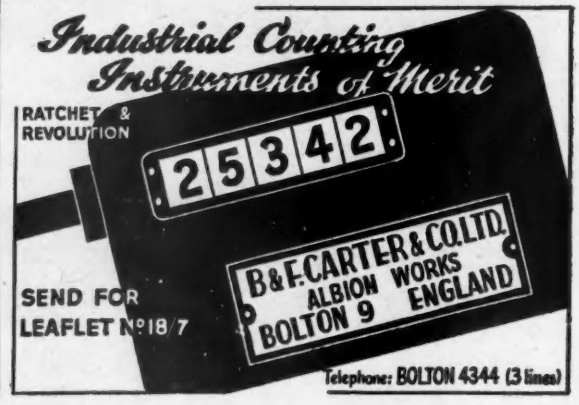

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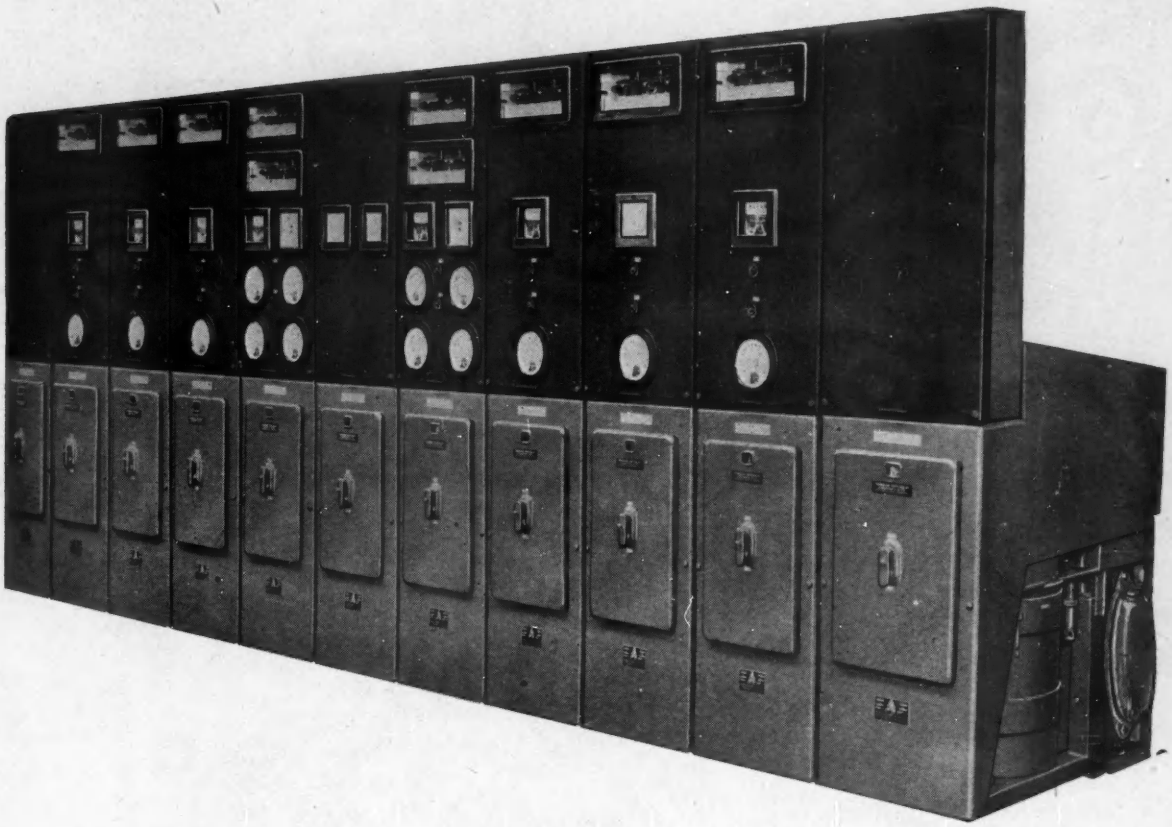

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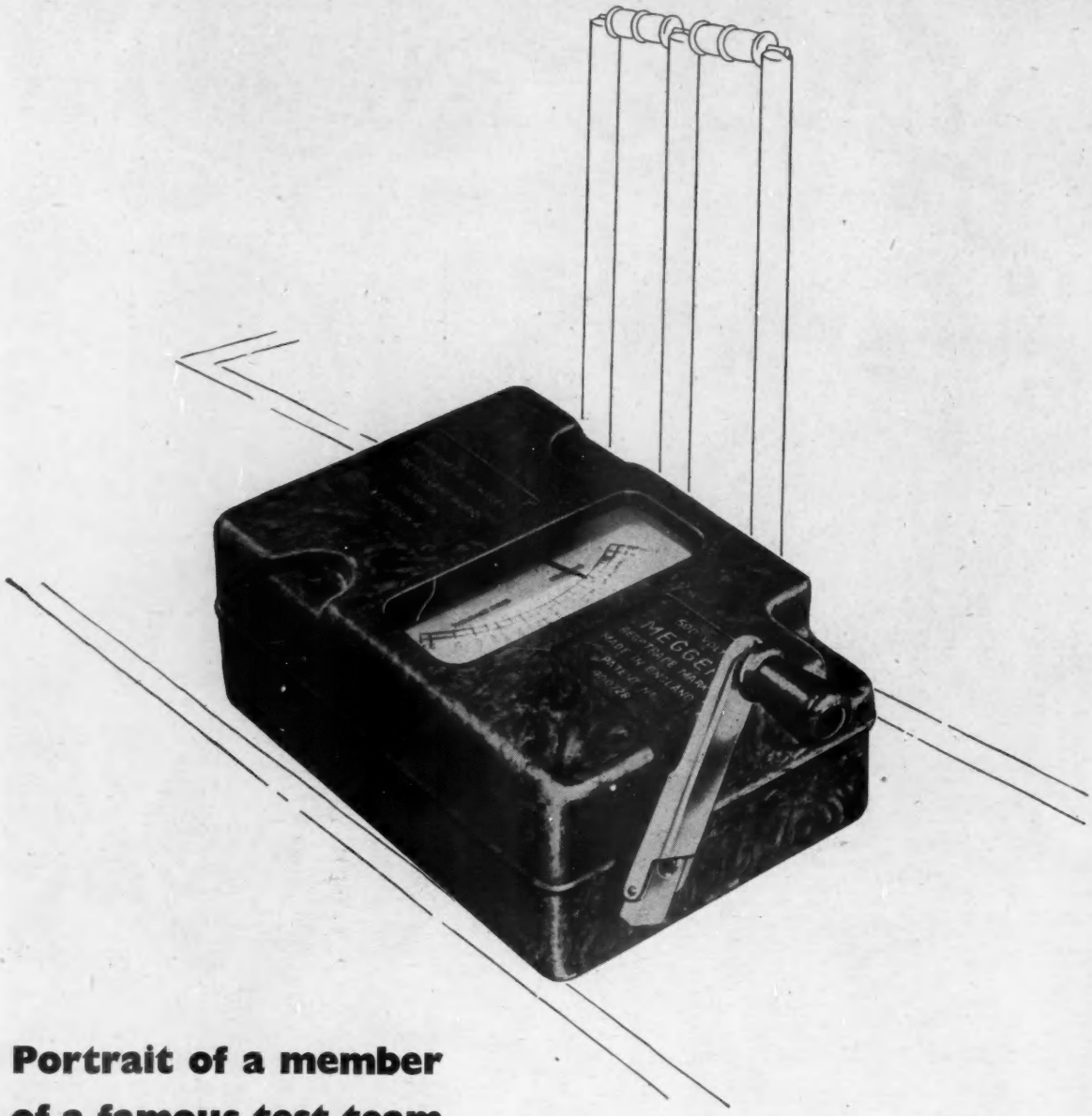

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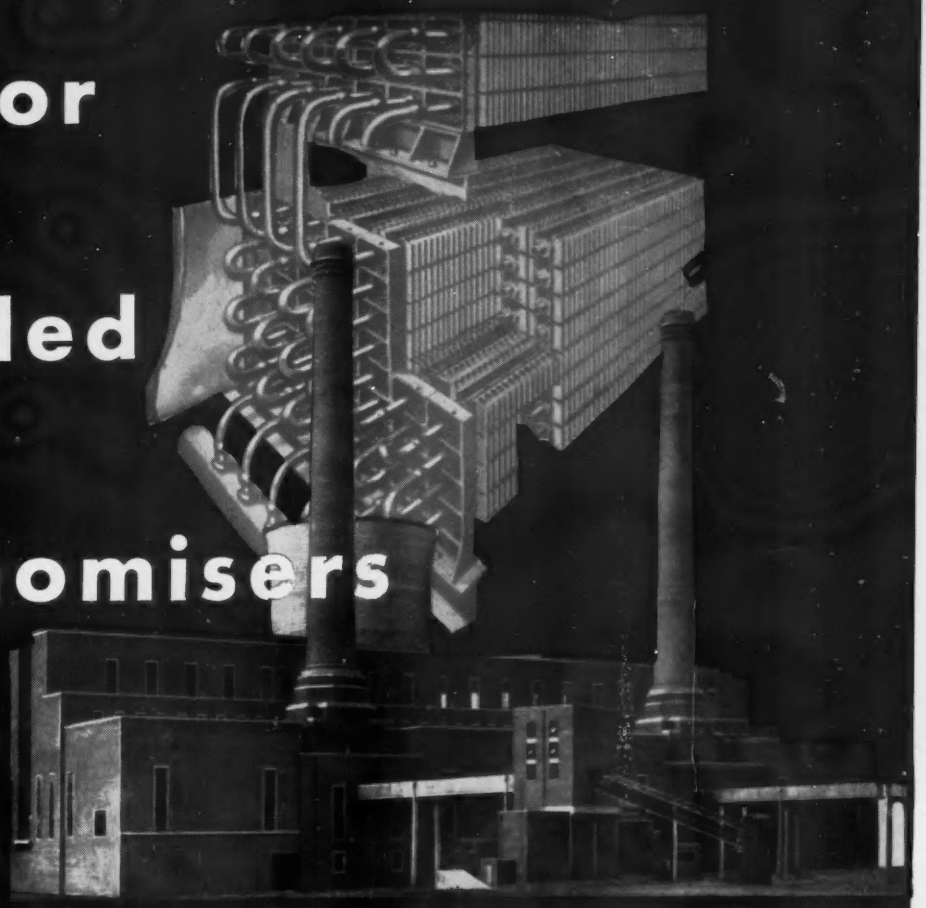

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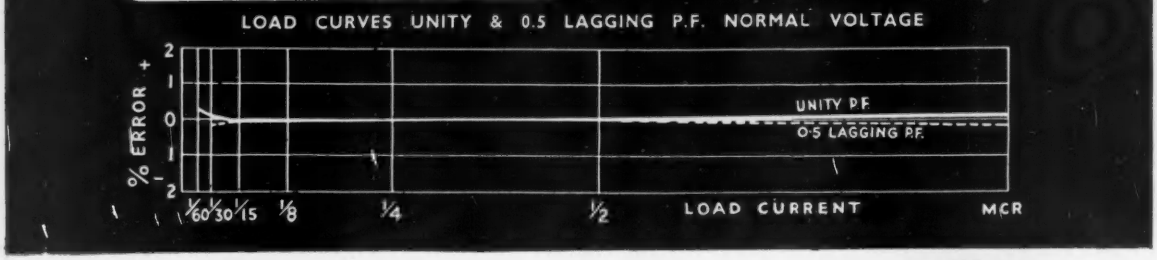

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